C 21.5: 949/4

Vol. 949 Number 4

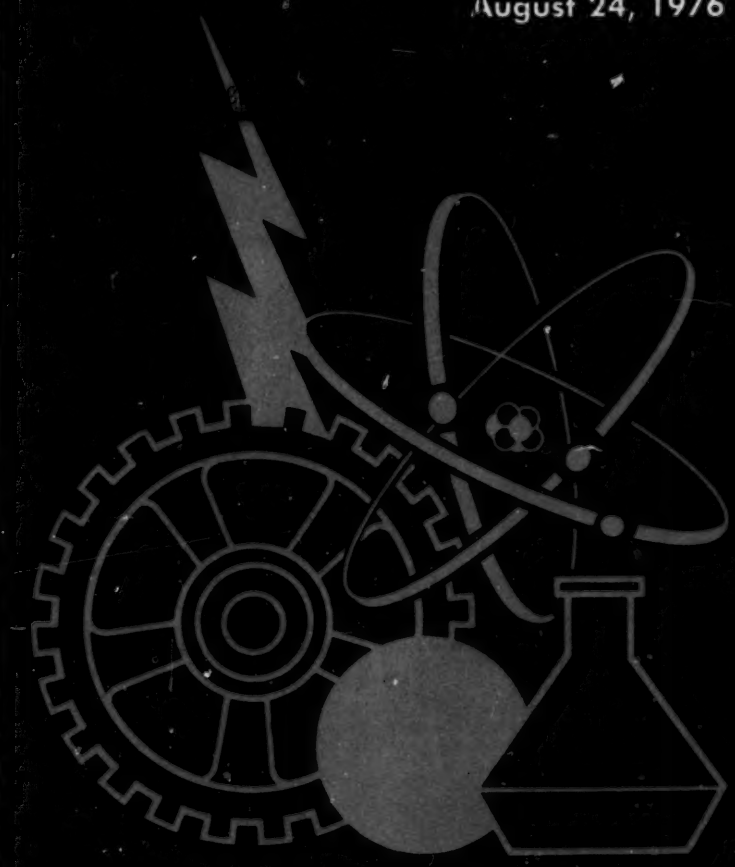
OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

August 24, 1976



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OFFICIAL GAZETTE of the
UNITED STATES PATENT and TRADEMARK OFFICE

August 24, 1976 Volume 949 Number 4

CONTENTS

	Page
Patent Notices	
Certificates of Correction for the Week of August 24, 1976	1284
Dedications	1284
Disclaimer and Dedication	1284
Disclaimers	1284
Condition of Patent Applications	1285
Reissue Patents Granted (28,936)	1286
Plant Patents Granted (3,941)	1289
Patents Granted	
General and Mechanical (3,975,775)	1291
Chemical (3,976,425)	1514
Electrical (3,976,825)	1623
Design Patents Granted (241,083)	1691
Index of Patentees	PI 1
Index of Reissue Patentees	PI 39
Index of Plant Patentees	PI 39
Index of Design Patentees	PI 39
Classification of	
Patents (Including Reissues)	PI 43
Designs and Plants	PI 45
Geographical Index of Residence of Inventors	
Patents (Including Reissues)	PI 46
Designs and Plants	PI 48

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PATENT NOTICES

Certificates of Correction for the Week of Aug. 24, 1976

3,350,684	3,914,028	3,942,436	3,953,372
3,604,257	3,915,816	3,943,220	3,953,742
3,769,257	3,916,074	3,943,386	3,953,982
3,781,333	3,916,149	3,943,436	3,954,025
3,781,936	3,917,585	3,943,693	3,954,064
3,786,095	3,917,654	3,944,861	3,954,383
3,790,559	3,917,931	3,944,389	3,954,430
3,791,586	3,918,046	3,944,724	3,954,484
3,792,928	3,918,999	3,944,727	3,954,555
3,793,238	3,920,831	3,945,267	3,954,574
3,799,164	3,920,835	3,945,378	3,954,634
3,806,565	3,925,062	3,945,453	3,954,774
3,807,304	3,925,398	3,945,795	3,954,792
3,807,305	3,927,700	3,946,338	3,954,935
3,808,052	3 927,929	3,946.729	3 955,064
3,809,562	3,928,376	3,946,843	3,955,482
3,815,627	3,928,581	3,947,242	3,955,608
3,816,134	3,929,878	3,947,437	3,956,046
3,819,713	3,929,886	3,947,835	3,956,110
3,825,629	3,930,732	3,947,913	3,956,182
3,838,379	3,932,635	3,948,022	3,956,623
3,842,101	3,932 942	3,948,292	3,956 725
3,850,594	3,933,246	3,948,619	3,956,740
3,850,611	3,933,672	3,948,890	3,956,751
3,855,359	3,933,737	3,949,106	3,957,288
3,856,780	3,933,797	3,949,343	3,957,406
3,856,799	3,933,800	3,949,621	3,957,424
3,859,354	3,933,833	3,949,642	3,957,743
3,872 098	3,934,793	3,949,896	3 957,813
3,876,593	3,934,966	3,950,213	3,957,951
3,877,518	3,935,534	3,950,225	3,958,097
3,879,442	3,936,207	3,950,248	3,958,515
3,882,290	3,937,851	3,950,249	3,958,853
3,883,066	3,937,848	3,950,253	3,959,636
3,884,787	3,938,097	3,950,267	3,959,718
3 895,014	3,939 115	3 950,392	3,959 726
3,896,051	3,939,269	3,950,531	3,960,449
3,899,727	3,939,730	3,950,806	3,960,785
3,902,971	3,939,878	3,950,847	3,960,984
3,903,052	3,940,230	3,950,863	3,961,120
3,904,331	3,940,389	3,951,065	3,961,329
3,905,408	3,940,392	3,951,184	3,961,957
3,905 830	3 940,548	3,951 231	3 961,959
3,906,008	3,940,701	3,951,894	3,962,211
3,909,737	3,941,507	3,951,897	3,962 221
3,911,333	3,941,810	3,951,920	3,962,400
3,912,752	3,942,058	3,952,046	3,962,523
3,913,750	3,942,163	3,952,372	3,963,951
3,913,769	3,942,354	3,952,655	3,964,709

Dedication

3,601,348.—*George E. Gonsalves* and *Felice Dosso*, Brooklyn, N.Y. RAIL SUPPORT FOR OVERHEAD CONVEYORS. Patent dated Aug. 24, 1971. Dedication filed June 30, 1976, by the assignee, *Erie Manufacturing Corp.*

Hereby dedicates to the Public the entire term of said patent.

Disclaimer and Dedication

3,660,623.—*Louis A. Bevacqua*, Des Plaines, Ill. DISTRIBUTOR SENSOR ADAPTOR. Patent dated May 2, 1972. Disclaimer and dedication filed June 14, 1976, by the assignee, *Motorola, Inc.*

Hereby enters a disclaimer and dedication to the Public of claims 1, 2, 3, 4 and 5 of said patent.

Disclaimers

3,465,685.—*Eugene L. Sherrod*, Brookfield, Wis. SELF-CLEARING ROTATING CONVEYOR. Patent dated Sept. 9, 1969. Disclaimer filed July 6, 1976, by the inventor, part interest.

Hereby enters this disclaimer to claims 1 and 2 of said patent.

3,572,340.—*John K. Lloyd*, Skokie, and *Phillip H. Darling*, Lake Zurich, Ill. SUCTION DRAINAGE DEVICE. Patent dated Mar. 23, 1971. Disclaimer filed Oct. 21, 1974, by the assignee, *The Kendall Company.*

Hereby enters this disclaimer to claims 1, 2, 7, 8 and 9 of said patent.

3,663,785.—*Elmer P. Hausermann*, Bensenville, Ill. METHOD OF EROSIVELY SHAPING A MASTER DIE. Patent dated May 16, 1972. Disclaimer filed Feb. 10, 1975, by the assignee, *Grafon Corporation.*

Hereby enters this disclaimer to claims 1, 2, 4 and 5 of said patent.

3,800,431.—*Otto Hubner*, Munich, Germany. PORTABLE HAIR DRYER HOOD. Patent dated Apr. 2, 1974. Disclaimer filed July 24, 1974, by the inventor.

The term of this patent subsequent to Apr. 1, 1991, has been disclaimed.

3,804,795.—*William O. Perry*, *Marius W. Sorenson*, and *Thomas J. Hairston*, Lake Jackson, Tex. HIGH MOLECULAR WEIGHT RESINS HAVING LOW SOLUTION VISCOSITIES. Patent dated Apr. 16, 1974. Disclaimer filed Jan. 22, 1975, by the assignee, *The Dow Chemical Company.*

Hereby enters this disclaimer to claims 1, 2, 3, 4, 5, 7 and 8 of said patent.

3,808,912.—*John E. Voorhees*, Sidney, and *Robert L. Schockman*, St. Henry, Ohio. ARRANGEMENT FOR DYNAMIC BALANCING OF A MECHANICAL PRESS, ESPECIALLY A HIGH SPEED MECHANICAL PRESS. Patent dated May 7, 1974. Disclaimer filed June 23, 1975 by the assignee, *The Minster Machine Company.*

Hereby enters this disclaimer to claims 1 and 10 of said patent.

3,822,618.—*Arthur A. Tomenceak*, Fairfield, Conn. CONTOUR MACHINING. Patent dated July 9, 1974. Disclaimer filed Dec. 16, 1974, by the assignee, *The Bullard Company.*

Hereby enters this disclaimer to claims 1, 2, 3 and 7 of said patent.

3,835,219.—*Karlis L. Jaunarajs*, Somerville, and *Julie C. Yang*, Somerset, N.J. METHOD FOR THE PREPARATION OF FIBROUS SOLUBLE CALCIUM SULFATE ANHYDRITE. Patent dated Sept. 10, 1974. Disclaimer filed Nov. 6, 1974, by the assignee, *Johns-Manville Corporation.*

Hereby enters this disclaimer to claims 1, 2, 4 and 5 of said patent.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF JULY 31, 1976

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds: Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry: Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	1-2-76
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	1-2-76
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	10-1-75
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products: Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	9-12-75
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	1-2-76
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	5-21-75
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	11-6-75
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	11-3-75
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	1-30-76
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	12-3-75
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	4-30-75
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	11-3-75
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus; Plastics Working Apparatus; Plastic Block and Earthenware Apparatus; Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	2-18-76
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	12-18-75
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	7-9-75
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	1-2-76

Expiration of patents: The patents within the range of numbers indicated below expire during August 1976, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 704), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,897,500 to 2,901,748 inclusive
Plant Patents..... Numbers 1,856 to 1,860 inclusive

PATENTS

AUGUST 24, 1976

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

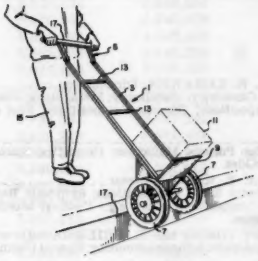
Re. 28,936
CART WITH AUTOMATIC POSITIONING HANDLE AND INDEPENDENTLY POSITIONABLE WHEELS

Rudolph Talamantez, 9 Oldham Road, Silver Spring, Md. 20901

Original No. 3,724,863, dated Apr. 3, 1973, Ser. No. 107,221, Jan. 18, 1971. Application for reissue Mar. 12, 1975, Ser. No. 557,540

Int. Cl.² B62B *3/22*

U.S. Cl. 280—5.2 **16 Claims**



1. A hand truck comprising a substantially upright frame member extending in a plane,

a platform extending from the lower end of the frame member transversely to said plane,

a pair of wheels,

means mounting the wheels on the lower end of the frame member for respective independent rotation about axes parallel to said plane on the side opposite to that on which the platform is located,

a handle pivoted to rotate freely on the upper end of the frame about an axis parallel to the wheel axes,

and stop means on the frame and handle for confining pivotal movement of the handle to a position above the platform.

Re. 28,937
CONTROL OF VISCOSITY AND POLYCAPROAMIDE DEGRADATION DURING VACUUM POLYCONDENSATION

John Walter Wagner, Petersburg, and John Christopher Haylock, Richmond, both of Va., assignors to Allied Chemical Corporation, Petersburg, Va.

Original No. 3,753,955, dated Aug. 21, 1973, Ser. No. 200,027, Nov. 18, 1971. Application for reissue June 19, 1974, Ser. No. 480,667

Int. Cl.² C08G *69/16*

U.S. Cl. 260—78 L **3 Claims**

1. In a process for the production of polycaproamide shaped articles from molten anhydrous nascent polymer comprising:

a. continuously polymerizing ϵ-caprolactam at an elevated pressure and temperature in the presence of small amounts of water and a terminating agent to form a prepolymer melt, then

b. continuously removing most of the water and part of unreacted lactam from said prepolymer melt by exposure to vacuum in a vessel providing said prepolymer melt with large surface area-to-volume ratio, residence time in said vessel being about 10 minutes, *wherein said polymer is not contacted with a gas following said polymerization*, then

c. continuously transferring said melt to a surface renewal device also having large surface area-to-volume ratio, which promotes completion of the polymerization reaction by polycondensation, and removes residual amounts of vaporizable materials, at a temperature between about 225°C. and about 300°C., and a residence time of more than 1 hour, then

d. continuously extruding said melt, and finally

e. cooling said extruded polymer to form uniformly shaped articles the improvement [comprising] *consisting essentially of the combination of*

carrying out step (c) at an absolute pressure of between about 31 mm. and about 150 mm. of Hg.,

subjecting said melt in step (c) to be sweeping flow of steam, and

maintaining the partial pressure of said steam in the vapor above said melt at above about 30 mm Hg.

[so that] *keeping* the extractables content of said [polycaproamide] *polycaprolactam* at the end of said polymerization [is] below 3.5% by weight,

minimizing thermal degradation of the polymer in the melt [is minimized] to within 3 units of the theoretical difference of ends, and

controlling the rate viscosity increase of the polymer melt *to* level [s] out after less than four hours to less than 10 FAV units per hour.

Re. 28,938
ORGANOPOLYSILOXANE COMPOSITION HAVING IMPROVED HEAT STABILITY

Yoshinobu Koda, Chiba; Shosaku Sasaki, and Yoshiyuki Koda, both of Ichihara, all of Japan, assignors to Toray Silicone Company, Ltd., Tokyo, Japan

Original No. 3,884,950, dated May 20, 1975, Ser. No. 424,524, Dec. 13, 1973. Application for reissue Sept. 15, 1975, Ser. No. 613,722

Claims priority, application Japan, Dec. 18, 1972, 47-126200

Int. Cl.² C07F *7/08*

U.S. Cl. 260—448.2 S **10 Claims**

1. A method for improving the heat stability of organosilicon compounds in which the substituents on the silicon are monovalent hydrocarbon or halogenated monovalent hydrocarbon radicals having 1 to 30 carbon atoms comprising adding thereto the reaction product of a cerium salt of an organic carboxylic acid which is soluble in an aromatic hydrocarbon solvent or a chlorinated hydrocarbon solvent with an alkali metal siloxanolate having an average of at least three organosiloxane units per molecule and in which the substituents on the silicon are methyl, ethyl, phenyl, vinyl or 3,3,3-trifluoropropyl.

Re. 28,939
3-AMINOINDAZOLE DERIVATIVES

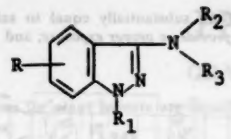
John J. Lafferty, Levittown; David H. Tedeschi, Pennsauken, and Charles L. Zirkle, Berwyn, all of Pa., assignors to SmithKline Corporation, Philadelphia, Pa.

Original No. 3,133,081, dated May 12, 1964, Ser. No. 156,154, Nov. 30, 1961. Application for reissue Sept. 28, 1972, Ser. No. 293,208

Int. Cl.² A61K *31/415*; C07D *231/56*

U.S. Cl. 424—273 **7 Claims**

1. A *pharmaceutical composition having analgesic and muscle relaxant activity, in dosage unit form, comprising a solid pharmaceutical carrier and from about 25 mg. to about 350 mg. of a* chemical compound of the class consisting of a free base and its nontoxic, pharmaceutically acceptable acid addition salts, the free base having the formula:



in which:

R is a member selected from the group consisting of halogen having an atomic weight of less than 80 and trifluoromethyl, said member being in a position β to the hetero ring;

R_1 is a member selected from the group consisting of hydrogen, lower alkyl and phenyl; and

R_2 and R_3 are members selected from the group consisting of hydrogen and lower alkyl.

Re. 28,940

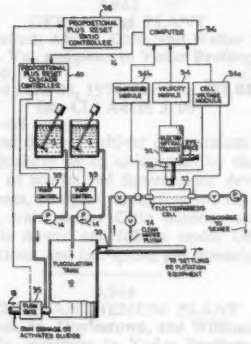
METHOD AND APPARATUS FOR AGGLOMERATION MEASURING AND CONTROL

Thomas R. Komline, Sr., deceased, late of Gladstone, N.J. by Elizabeth M. Komline, executrix, and Walter R. Wills, Cedar Knolls, N.J., assignors to Komline-Sanderson Engineering Corporation, Peapack, N.J.

Original No. 3,723,712, dated Mar. 27, 1973, Ser. No. 188,516, Oct. 12, 1971. Application for reissue Mar. 8, 1974, Ser. No. 449,487

Int. Cl.[2] G06F *15/46*; **G01N** *21/28, 33/16*

U.S. Cl. 235—151.31 **17 Claims**



1. A method for determining the Zeta Potential of suspended colloidal particles comprising the steps of:

a. establishing a predetermined voltage gradient along an electrophoresis cell positioned on a microscope stage,

b. introducing a sample of said suspended colloidal particles into said cell,

c. scanning a microscopic image of said colloidal particles within said cell,

d. tracking said particles to determine their movement,

e. storing data representative of said particle movement;

f. calculating the particle velocity from said data, and

g. determining the Zeta potential from said particle velocity, the voltage gradient of said cell, and the temperature of said suspended colloidal particles sample.

Re. 28,941

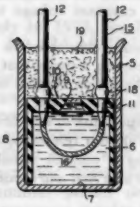
ELECTROLYTIC TIMER DELAY CAPSULE

John Paul Jones, Jr., Wayne, Pa., assignor to Air Products and Chemicals, Inc., Allentown, Pa.

Original No. 3,711,751, dated Jan. 16, 1973, Ser. No. 106,481, Jan. 14, 1971. Application for reissue Apr. 20, 1973, Ser. No. 352,895

Int. Cl.[2] H01G *9/18*

U.S. Cl. 317—232 **12 Claims**



11. An electrolytic timer device for use in electrical circuits detecting rupture of a circuit conductive path after a predetermined time period of electroplating away an electrode member in said path comprising in combination, a cathode electrode, an anode electrode of conductive metal wire comprising a source of metal to be plated away until the wire ruptures, and an electrolyte solution between said electrodes causing said anode electrode wire to plate away on said cathode electrode and rupture said wire wherein the anode wire electrode has two leads presented for connection to said electrical circuits for detection of rupture therebetween and the portion of said wire intermediate the leads is immersed in said solution and means producing a concentrated electric field pattern on a portion of said anode said means being formed by the configuration of said anode wire into a shape presenting said portion as a single small apex part of its total length to protrude into a position significantly closer than the remainder of its length to said cathode with the electrolyte solution therebetween thereby assuring continued etching at said portion producing uniform time periods to rupture of the wire by electroplating when a d-c potential source is connected between said cathode and anode wherein said cathode is a cup-shaped container with an open mouth and a closed bottom having only the closed bottom exposed to said electrolyte, said two leads constitute an integral continuous portion of said anode wire disposed in said electrolyte with the leads extending from said container, and wherein said protruding portion is disposed with its apex directed toward the closed bottom of said container.

Re. 28,942

EXPOSURE TIME CONTROL DEVICE FOR A THROUGH THE LENS TYPE SINGLE REFLEX CAMERA

Yasuhiro Nanba, Toyokawa; Masayoshi Sahara, Sakai, and Kintaro Yada, Ikeda all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Original No. 3,756,130, dated Sept. 4, 1973, Ser. No. 132,104, Apr. 7, 1971. Application for reissue Sept. 4, 1975, Ser. No. 610,421

Claims priority, application Japan, Apr. 7, 1970, 45-29019 Apr. 7, 1970, 45-29020

Int. Cl.[2] G03B *7/08*

U.S. Cl. 354—24 **10 Claims**

1. An automatic shutter control device for a single lens reflex camera of the type having a photoconductive member receiving light from an object to be photographed via an objective lens, comprising:

means for generating a first output voltage proportional to the logarithm of intensity of light incident on said photoconductive member;

means for storing said first output voltage;

means for separating said means for storing from said means for generating a first output voltage with the shutter release operation;

means for generating a second output voltage as a function of a manually set exposure condition;

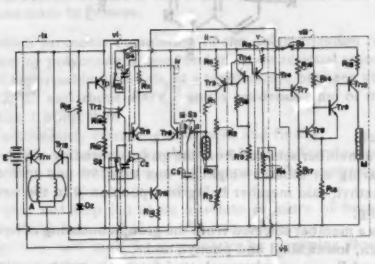
a transistor;

means for applying constant voltage to the base of said transistor;

a first integrating means connected to the emitter of said transistor for generating a signal that changes in proportion to the logarithm of an elapsed time period initiated by the shutter release operation;

means for initiating operation of said first integrating means in response to the shutter release operation;

means for generating a control signal when said signal [plus] *relative to* said *first and* second output [voltage] *voltages* [are substantially equal to said first output voltage] *provides a proper exposure*; and



means for actuating shutter closing operation in response to said control signal.

PLANT PATENTS

GRANTED AUGUST 24, 1976

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

3,941
GERANIUM PLANT

William E. Duffett, Akron, Ohio, and Walter W. Knicely, Inwood, W. Va., assignors to Yoder Brothers, Inc., Barberton, Ohio

Filed June 20, 1975, Ser. No. 588,941
Int. Cl.[2] A01H 5/00
U.S. Cl. Plt.—68 1 Claim

1. A new and distinct cultivator of geranium plant characterized particularly as to uniqueness by the combined characteristics of coral rose flower color with minimal color fade, compact, spreading growth habit, prolific flowering traits under Ohio outdoor summer conditions, durable flower and foliage under Ohio outdoor summer conditions, and fast spring pot flowering response.

3,942
GERANIUM PLANT

William E. Duffett, Akron, Ohio, and Walter W. Knicely, Inwood, W. Va., assignors to Yoder Brothers, Inc., Barberton, Ohio

Filed June 20, 1975, Ser. No. 588,849
Int. Cl.[2] A01H 5/00
U.S. Cl. Plt.—68 1 Claim

1. A new and distinct cultivar of geranium plant characterized particulary as to uniqueness by the combined characteristics of light salmon pink flower color with minimal color oxidation; compact, spreading growth habit; prolific flowering traits under Ohio outdoor summer conditions; durable flower and foliage under Ohio outdoor summer conditions, and fast spring pot flowering response..

3,943
GERANIUM PLANT

William E. Duffett, Akron, Ohio, and Walter W. Knicely, Inwood, W. Va., assignors to Yoder Brothers, Inc., Barberton, Ohio

Filed June 20, 1975, Ser. No. 588,842
Int. Cl.[2] A01H 5/00
U.S. Cl. Plt.—68 1 Claim

1. A new and distinct cultivar of geranium plant characterized particularly as to uniqueness by the combined characteristics of scarlet red flower color devoid of blue and orange tones, compact, spreading growth habit, prolific flowering traits under Ohio outdoor summer conditions, durable flower and foliage under Ohio outdoor summer conditions, and fast spring pot flowering response.

3,944
CHRYSANTHEMUM PLANT

Walter H. Jessel, Jr., Doylestown, and William E. Duffett, Akron, Ohio, assignors to Yoder Brothers, Inc., Barberton, Ohio

Filed July 16, 1975, Ser. No. 596,102
Int. Cl.[2] A01H 5/00
U.S. Cl. Plt.—74 1 Claim

1. A new and distinct cultivar of chrysanthemum known by the cultivar name Sophisticate and particularly characterized as to uniqueness by the combined features of daisy inflorescence type; flat inflorescence form not known to reflex at maturity; diameter of face of inflorescence up to 5.5 inches at maturity; ivory white ray floret color; medium green disc floret color at immature, unopened stage; minimal pollen development; uniform 9 week (disbud) and 10 week (spray) flowering response period; responsiveness to the growth retardant B-9 SP (Alar) for reduction in internode length, and permanence of inflorescence averaging from 18–22 days.

3,945
CHRYSANTHEMUM PLANT

Walter H. Jessel, Jr., Doylestown, and William E. Duffett, Akron, Ohio, assignors to Yoder Brothers, Inc., Barberton, Ohio

Filed July 16, 1975, Ser. No. 596,101
Int. Cl.[2] A01H 5/00
U.S. Cl. Plt.—74 1 Claim

1. A new and distinct cultivar of chrysanthemum known by the cultivar name Accent and particularly characterized as to uniqueness by the combined features of flat inflorescence form, not known to reflex; daisy inflorescence type; purple ray floret color with minimal color oxidation; medium green disc floret color at immature, unopened stage; minimal pollen development; diameter across face of inflorescence ranging from 3.0 to 4.0 inches at maturity; uniform nine week flowering response period; medium plant height, and semi-upright branching pattern.

3,946
CHRYSANTHEMUM PLANT

Walter H. Jessel, Jr., Doylestown, and William E. Duffett, Akron, Ohio, assignors to Yoder Brothers, Inc., Barberton, Ohio

Filed July 24, 1975, Ser. No. 598,867
Int. Cl.[2] A01H 5/00
U.S. Cl. Plt.—74 1 Claim

1. A new and distinct cultivar of chrysanthemum known by the cultivar name Spark and particularly characterized as to uniqueness by the combined characteristics of flat inflorescence form; daisy inflorescence type having a slight elongation of the disc florets thereby producing a crested anemone appearance; red ray floret color; semi-spreading branching pattern; seven week flowering response; medium plant height, scant pollen; permanence of inflorescence, averaging from 14 to 18 days, and dark green foliage color with high gloss appearance.

3,947
CHRYSANTHEMUM PLANT

Walter H. Jessel, Jr., Doylestown, and William E. Duffett, Akron, Ohio, assignors to Yoder Brothers, Inc., Barberton, Ohio

Filed Aug. 4, 1975, Ser. No. 601,633
Int. Cl.[2] A01H 5/00
U.S. Cl. Plt.—74 1 Claim

1. A new and distinct form of chrysanthemum plant known by the cultivar name Firepower and particularly characterized by the combined characteristics of flat inflorescence form which reflexes slightly with age; daisy inflorescence type; diameter across face of inflorescence up to 4.0 inches at maturity; red ray floret color, with blue highlights; medium green disc floret color at immature, unopened stage; minimal pollen development; semi-upright branching habit, tall plant height, and its high percentage gradeout in top grades (SAF standards).

3,948
PEPEROMIA PLANT (PINK GLOW)

Ralph Pinkus, 7700 Northaven Road, Dallas, Tex. 75230

Filed Aug. 27, 1975, Ser. No. 608,382
Int. Cl.[2] A01H 5/00
U.S. Cl. Plt.—88 1 Claim

1. A new and distinctive variety of Peperomia plant substantially as herein shown and described, characterized by the unique combination of pink and white stripes and bronze appearance in the center of the leaf.

PLANT PATENTS

GRANTED AUGUST 24, 1976

Illustrations for plant patents are usually in color and

3,941
GERANIUM PLANT
William E. Durfee, Akron, Ohio, and Walter W. Kelsey, Inwood, W. Va., assignors to Yoder Brothers, Inc., Barberton, Ohio
Filed June 20, 1975, Ser. No. 588,639
Int. Cl.² A01H 5/00
U.S. Cl. PP—54 1 Claim

1. A new and distinct cultivar of geranium plant characterized particularly as to uniqueness by the combined characteristics of light salmon pink flower color with minimal color oxidation, compact, spreading habit, prolific flowering traits under Ohio outdoor summer conditions, durable flower and foliage under Ohio outdoor summer conditions, and fast spring pot flowering response.

3,943
GERANIUM PLANT
William E. Durfee, Akron, Ohio, and Walter W. Kelsey, Inwood, W. Va., assignors to Yoder Brothers, Inc., Barberton, Ohio
Filed June 20, 1975, Ser. No. 588,643
Int. Cl.² A01H 5/00
U.S. Cl. PP—54 1 Claim

1. A new and distinct cultivar of geranium plant characterized particularly as to uniqueness by the combined characteristics of coral rose flower color with minimal color oxidation, compact, spreading habit, prolific flowering traits under Ohio outdoor summer conditions, durable flower and foliage under Ohio outdoor summer conditions, and fast spring pot flowering response.

3,944
CHRYSANTHEMUM PLANT
Walter H. Jezeil, Jr., Doylestown, and William E. Durfee, Akron, Ohio, assignors to Yoder Brothers, Inc., Barberton, Ohio
Filed July 16, 1975, Ser. No. 596,167
Int. Cl.² A01H 5/00
U.S. Cl. PP—54 1 Claim

1. A new and distinct cultivar of chrysanthemum plant known by the cultivar name Fireprove and particularly characterized by the combined characteristics of the flowering form which ordinarily will set many flowers up to 4.0 inches in diameter, red ray flower color, with blue pigmented medium green disc floret color at immature, pigmented stage; minimal pollen development; semi-upright plant habit; and its high percentage

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3,946
CHRYSANTHEMUM PLANT
Walter H. Jezeil, Jr., Doylestown, and William E. Durfee, Akron, Ohio, assignors to Yoder Brothers, Inc., Barberton, Ohio
Filed July 16, 1975, Ser. No. 596,167
Int. Cl.² A01H 5/00
U.S. Cl. PP—54 1 Claim

1. A new and distinct cultivar of chrysanthemum plant characterized particularly as to uniqueness by the combined characteristics of light yellow flower color with minimal color oxidation, compact, spreading habit, prolific flowering traits under Ohio outdoor summer conditions, durable flower and foliage under Ohio outdoor summer conditions, and fast spring pot flowering response.

3,947
CHRYSANTHEMUM PLANT
Walter H. Jezeil, Jr., Doylestown, and William E. Durfee, Akron, Ohio, assignors to Yoder Brothers, Inc., Barberton, Ohio
Filed Aug. 4, 1975, Ser. No. 601,815
Int. Cl.² A01H 5/00
U.S. Cl. PP—54 1 Claim

1. A new and distinct form of chrysanthemum plant known by the cultivar name Fireprove and particularly characterized by the combined characteristics of the flowering form which ordinarily will set many flowers up to 4.0 inches in diameter, red ray flower color, with blue pigmented medium green disc floret color at immature, pigmented stage; minimal pollen development; semi-upright plant habit; and its high percentage

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3,948
PETUNIA PLANT (PINK GLOW)
Robin Parker, 7750 Northern Road, Dublin, Ohio, 43017
Filed Aug. 25, 1975, Ser. No. 608,261
Int. Cl.² A01H 5/00
U.S. Cl. PP—54 1 Claim

1. A new and distinctive variety of Petunia plant substantially as herein shown and described, characterized by the unique combination of pink and white edges and reverse appearance in the center of the leaf.

PATENTS

GRANTED AUGUST 24, 1976

ERRATA

For CLASS	See PATENT NO.
029–157 R	3,975,826
073–411	3,975,967
061–089	3,976,021
134–006	3,976,086
280–032.5	3,976,155
209–011	3,976,197
144–241	3,976,271
526–078	3,976,626
526–014	3,976,627
526–022	3,976,628
526–227	3,976,629
526–335	3,976,630
526–064	3,976,631
526–113	3,976,632
423–251	3,976,775
526–023	3,976,824
013–023	3,976,829

PATENTS

GRANTED AUGUST 24, 1976

ERRATA

For CLASS	See PATENT NO.
029-157 R	3,975,826
073-411	3,975,967
081-089	3,976,021
134-006	3,976,088
280-03[illegible]5	3,976,155
209-011	3,976,197
144-241	3,976,271
526-078	3,976,626
526-014	3,976,627
526-022	3,976,628
526-227	3,976,629
526-133	3,976,630
526-064	3,976,631
526-173	3,976,632
423-251	3,976,773
526-023	3,976,824
013-021	3,976,829

PATENTS

GRANTED AUGUST 24, 1976

GENERAL AND MECHANICAL

3,975,775

EXAMINING GLOVE

Reese Fell Alsop, Lloyd Lane, Lloyd Neck, Huntington, N.Y. 11743

Filed July 9, 1973, Ser. No. 377,491
Int. Cl.² A41D *19/00*
U.S. Cl. 2—163 **4 Claims**

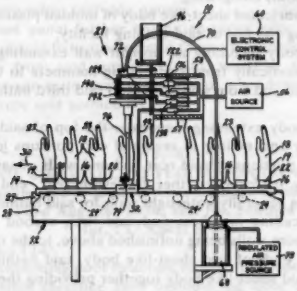
1. A glove having a plurality of fingers one of which is at least partially everted and a rupturable seal forming a lubricant containing space within the everted portion of the finger, the length of said one finger including the everted portion thereof and measured from the crotch between said one finger and an adjacent finger being substantially equal to a nominal finger length for which the glove is intended, said seal being constituted, in the everted condition of said one finger, as means preventing the egress of lubricant from said lubricant containing space and, upon donning the glove, as means permitting the passage of a finger of a wearer to cause said one finger to adopt a non-everted attitude whereby the exterior surface of said one finger is lubricated.

3,975,776

METHOD FOR MAKING ELASTIC GLOVES

Weldon R. Ayres, Willard, Ohio, assignor to Sherwood Medical Industries Inc., St. Louis, Mo.

Filed Jan. 31, 1975, Ser. No. 546,055
Int. Cl.² B29C *13/00*; B29H *3/04*, *7/00*
U.S. Cl. 2—168 **13 Claims**



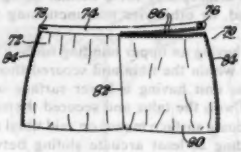
1. A method of making an elastic glove having a banded cuff comprising the steps of coating a glove form with an elastomeric material to form a glove on the glove form having hand and cuff portions, circumferentially extruding a ring of an elastomeric material in liquid form around and onto the cuff portion of the glove on the glove form while the glove form is stationary, curing the stripe in situ to form an elastic band on the cuff portion of the glove, and removing the glove with the elastic band thereon from the glove form.

3,975,777

GARMENT CONSTRUCTIONS

Laura C. Roy, 122 Laird St., Greensburg, Pa. 15601

Continuation-in-part of Ser. No. 427,825, Dec. 26, 1973, Pat. No. 3,859,667. This application Dec. 19, 1974, Ser. No. 534,282
Int. Cl.² A41D *1/14*
U.S. Cl. 2—211 **17 Claims**



1. A garment construction comprising waistline means for encircling a wearer's waist, at least one front garment panel having an upper edge thereof secured to a front portion of said waistline means, at least one rear garment panel having an upper edge thereof secured to a rear portion of said waistline means, first lateral joining means for joining the left lateral edges of said garment panels, second lateral joining means for joining the right lateral edges of said panels, at lease one of said lateral joining means being quick-detachable to provide a closable garment opening thereby, quick-detachable waistline joining means for detachably joining ends of said waistline means in juxtaposition to said quick-detachable lateral joining means, said front garment panel having a bifurcate configuration, said rear garment panel having a bifurcate configuration, means for quick-detachably joining said rear panel upper edge to said waistline means so that said rear panel is detachable from said waistline means and from at least one side of said front panel for folding therecross, and additional quick-detachable joining means for temporarily securing said rear panel to said front panel when so folded, means for quick-detachably joining the inward bifurcate edges of said panels to form a severable crotch for said garment construction, whereby said garment can be donned and doffed in wrap-around fashion.

9. A garment construction comprising waistline means, at least one front garment panel having an upper edge portion thereof secured to a front portion of said waistline means, at least one rear garment panel having an upper edge portion thereof detachably secured to a rear portion of said waistline means, quick-detachable, securing means for so securing said rear panel upper edge portion to said waistline means, means for joining the left lateral edges of said garment panels together, means for joining the right lateral edges of said garment panels together, at least one of said lateral joining means being quick-detachable to provide a reclosable garment opening thereat, quick-detachable means for joining ends of said waistline means in juxtaposition to said detachable lateral joining means, whereby said rear garment panel can be substantially disengaged from said waistline means and from one side of said front garment panel and folded thereacross, said waistline means retaining said garment construction about a wearer's waist.

3,975,778

TOTAL ANKLE ARTHROPLASTY

St. Elmo Newton, III, 801 Broadway, Seattle, Wash. 98122

Filed July 14, 1975, Ser. No. 595,518
Int. Cl.² A61F 1/24
U.S. Cl. 3—1.91 4 Claims

1. An ankle arthroplasty for a human being having a diseased, damaged, or otherwise malfunctioning tibia or talus, comprising:

a tibial unit having an upper bonding surface adapted to be imbedded within the tibia and secured thereto,

a lower talar unit having a lower surface adapted to be imbedded with the talus and secured thereto, and

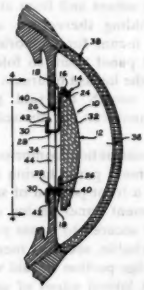
opposed, arcuate surface means on said tibial and talar units for providing at least arcuate sliding between the two units in a transverse vertical plane and arcuate fore and aft sliding movement in the sagittal plane, one of said opposed arcuate surfaces being a portion of a cyinder and the other being a portion of a sphere having a radius less than the radius of the cylinder portion, whereby one arcuate surface can rock on the other arcuate surface.

3,975,779

ARTIFICIAL INTRAOCULAR LENS AND SUPPORTING SYSTEM THEREFOR

William Richards, Medway, and Bernard Grolman, Worcester, both of Mass., assignors to American Optical Corporation, Southbridge, Mass.

Continuation-in-part of Ser. No. 566,542, April 9, 1975, abandoned. This application June 16, 1975, Ser. No. 587,483
Int. Cl.² A61F 1/16, 1/24
U.S. Cl. 3—13 12 Claims



1. A pseudophakos comprising:

a lens;

a plurality of slender and resilient supporting arms affixed to said lens adjacent its periphery and each extending along one side thereof;

each of said arms terminating with an iris clip portion for receiving the irido-pupillary margin when the pseudophakos is implanted for use;

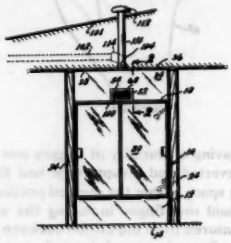
said arms being lightly spring biased toward the periphery of said lens and so proportioned as to resiliently urge their corresponding clip portions against said pupillary margin with a gentle holding force when the pupil is approximately maximally dilated and to follow said pupillary margin to the extent of maximum pupillary contraction substantially without affect upon normal pupil function whereby dislocation of the implanted pseudophakos occurring as a result of dilation and contraction of a dynamic pupil is prevented.

3,975,780

BATHING FACILITY INCORPORATING BATHROOM AIR EXHAUST FANS

Duane C. Bowen, 2290 Nob Hill Drive, Carlsbad, Calif. 92008, and Troy L. Doan, 924 Phillips, Vista, Calif. 92083

Filed Mar. 31, 1975, Ser. No. 563,796
Int. Cl.² F24F 7/06
U.S. Cl. 4—146 18 Claims



1. In a bathroom having a prefabricated bathing facility factory manufactured separately and placed in an end of said bathroom, said bathroom having been constructed as a part of a building, said bathroom having floor members, ceiling members, and studding forming a first bathroom rear wall and second and third bathroom end walls meeting said rear wall at right angles, said bathing facility being molded and being made primarily of plastic material, said facility having a top horizontal rail and a front closure supported from said rail, said facility resting on said floor members and extending upwardly to a level near to the height of said rail and spaced from said ceiling members, said facility having a bottom and having rear and end walls rising from said bottom to said level and respectively secured to and resting against said first rear wall and said second and third end walls, means forming a top for said bathing facility and providing exhaust fan means for said bathroom, comprising:

a. a prefabricated sheet-like body of molded plastic material forming the top of said bathing facility,

b. said body including an upright wall extending substantially vertically from said ceiling members to the top of said rail and from said second to said third bathroom end wall,

c. said body extending from near the top of said rail rearwardly and ending in rear and end portions joining the upper portions of said rear and end walls of said bathing facility to form together therewith rear, end, top and bottom generally watertight walls for said bathing facility,

d. said ceiling members and said first, second and third bathroom walls being unfinished above, to the rear of and to the ends of said sheet-like body, said bathing facility and said sheet-like body together providing the finish for said end of said bathroom,

e. an air outlet in at least one of the walls formed by said facility and body,

f. conduit means connecting said air outlet to the exterior of said building to exhaust air from said bathroom out of said building, and

g. fan means operative to pull air from said bathroom into said air outlet and to force said air through said conduit

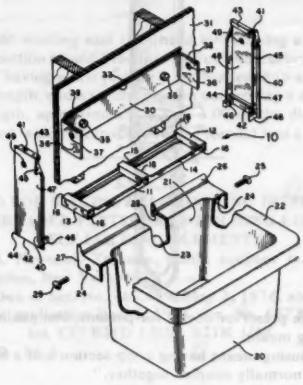
means out of said building, said air outlet, conduit means and fan means being the sole exhaust fan means from said bathroom and bathing facility to outside of said building.

3,975,781

FIXTURE INSTALLATION ASSEMBLY

Morris Klimboff, Cincinnati, Ohio, and Wilfred G. Harvey, Sr., East Brunswick, N.J., assignors to Powers-FIAT Corporation, Skokie, Ill.

Filed Aug. 11, 1975, Ser. No. 603,370
Int. Cl.² A47K 1/04; E03C 1/32, 1/13
U.S. Cl. 4—170 **8 Claims**



1. In a fixture installation assembly adapted to be hung from support means secured to a surface member, said support means being further adapted to support said fixture in hanging relation, the invention comprising:

a pair of side panels, adapted to hang substantially vertically from said support means, each of said side panels having, near the lower end thereof, a side panel attachment member;

a bottom panel of predetermined dimensions having, near each end thereof, a bottom panel attachment member; one of said attachment members comprising latching means, and the other of said attachment members comprising latch engagement means, so that said bottom panel is supportively secured to said side panels;

said bottom panel further having an outer edge adapted to intercept said fixture when said fixture is secured in hanging relation from said support means, whereby said bottom member serves to space said fixture a predetermined distance from said surface member.

3,975,782

POOL SIDEWALL TO FLOOR CONNECTION

Jay A. Lankheet, 579 Ottawa Ave., Holland, Mich. 49423

Filed Aug. 26, 1974, Ser. No. 500,614
Int. Cl.² E04H 3/16
U.S. Cl. 4—172 **1 Claim**

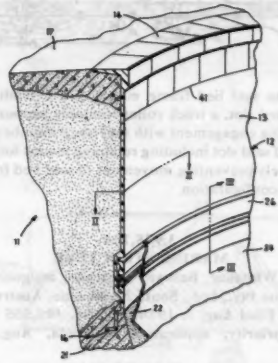
1. In a swimming pool structure having rigid sidewall means and a flexible sheetlike liner defining the floor of the pool structure, the liner having the edge thereof connected to the sidewall means, the improvement comprising:

connecting means coacting between the peripheral edge portion of said liner and said sidewall means for mechanically and sealingly connecting said peripheral edge portion of said liner to said sidewall means at a location disposed so that a majority of the surface area of the sidewall means is not covered by said liner;

said connecting means including first means mechanically connecting said liner to said sidewall means at a location disposed adjacent the lower end of said sidewall means and second means for sealing said liner to said sidewall means at a location disposed closely adjacent but spaced slightly upwardly from said first means;

said first means including a first elongated groove formed in said sidewall means adjacent the lower end thereof, said first groove being spaced upwardly a small distance above the intersection between the floor and the sidewall means, and said liner having an enlarged bead formed thereon adjacent the free edge thereof, said enlarged bead being lockingly held within said first groove;

said second means including a second elongated groove formed in said sidewall means, said second groove being spaced upwardly a small distance from said first groove, said



liner including a flaplike extension projecting upwardly above said first groove and having the free edge thereof positioned within said second groove, said second means also including sealant means positioned within said second groove and sealingly connecting said liner to said sidewall means; and

said sidewall means includes a plurality of separate wall panels formed from a plastic material and each having a wall portion adjacent the lower end thereof near the intersection of said sidewall means and said floor that is thicker than the remainder of said sidewall means, said wall portion having said second groove formed therein, and an aluminum member embedded within said wall portion below said second groove, said aluminum member having two oppositely opening channels with one of said channels opening outwardly of said sidewall means and defining said first groove.

3,975,783

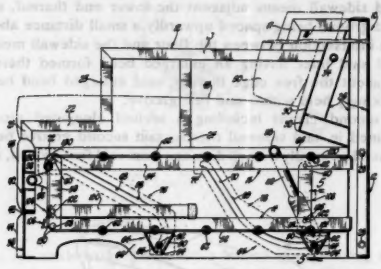
SOFA BED

William L. Pringle, Grosse Pointe Shores, Mich., assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed June 10, 1975, Ser. No. 585,684
Int. Cl.² A47C 17/14
U.S. Cl. 5—18 R **25 Claims**

1. A furniture assembly for movement between a sitting configuration and a bed configuration comprising; support frame means, bed frame means movable between a folded position and an unfolded position, said bed frame means being in said folded position when in said sitting configuration and in said unfolded position when in said bed configuration, track means interconnecting said support frame means and said bed frame means for guiding movement of said bed frame means relative to said support frame means during movement of said bed frame means between said sitting configuration and an

intermediate position in which said bed frame means may be moved between said folded and unfolded positions, said track means including a first plate secured to said support frame means, said plate having a first elongated slot therein, a first track member secured to said plate and including at least one laterally extending surface adjacent said slot, a first shaft



connected to said bed frame means and extending through said elongated slot, a track roller rotatably supported on said shaft in rolling engagement with said track member, said track member and said slot including retaining means for supporting and selectively preventing movement of said bed frame means in said bed configuration.

3,975,784

MARINE STRUCTURE

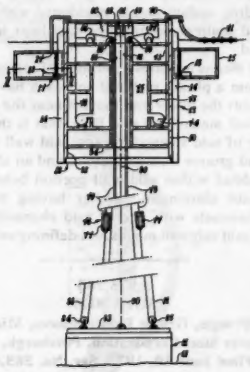
Charles T. Whitaker, Balwyn, Australia, assignor to Marine Consultants Pty., Ltd., South Melbourne, Australia

Filed Aug. 7, 1974, Ser. No. 495,535

Claims priority, application Australia, Aug. 9, 1973, 4419/73

Int. Cl.² B63B *21/52*

U.S. Cl. 9—8 R **14 Claims**



1. A marine structure comprising an elongated tower, means flexibly connecting said tower to an anchoring base on a sea bed, a buoyant member carried by said tower and being arranged for generally vertical movement therealong, said buoyant member totally circumferentially surrounds said tower, said buoyant member including at least one chamber, guide means longitudinal of said tower between said tower and said buoyant member for guiding relative vertical movement therebetween and restraining relative rotational movement therebetween, and means for fixedly securing said buoyant member relative to said tower at selected relative vertical positions therealong.

3,975,785

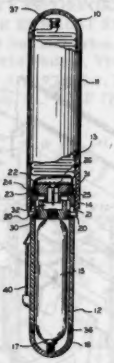
LIFE PRESERVER BATON

Carl Stadeker, 11001 S. Parnell, Chicago, Ill. 60628

Continuation-in-part of Ser. No. 467,296, May 6, 1974, abandoned. This application Mar. 3, 1975, Ser. No. 555,200

Int. Cl.² B63C *9/16*

U.S. Cl. 9—319 **11 Claims**



8. A life preserver device for persons, comprising:

housing means,

said housing means having a top section and a bottom section normally coupled together,

inflatable collar means,

said inflatable collar means being held in said top section in a folded, deflated attitude;

pressurized gas container means,

said gas container means positioned in said bottom section,

said pressurized gas container means inflatably connected to said collar means;

inflating means,

said inflating means including restraining means,

said restraining means being adapted to prevent inflation of said collar means while said top section is coupled to said bottom section,

said restraining means being defeated by uncoupling said top section from said bottom section and,

means for preventing said collar means from being captured in said top section while said collar is being inflated.

3,975,786

METHOD OF FORMING A RIVET OF TITANIUM-COLUMBIUM ALLOY

Roland Howard Gapp, South Laguna; Rahmatollah Fakhri Toosky, Laguna Hills, and Ira Bill Lee York, Costa Mesa, all of Calif., assignors to Textron, Inc.

Division of Ser. No. 329,590, Feb. 5, 1973, Pat. No. 3,911,783. This application June 26, 1975, Ser. No. 590,693

Int. Cl.² B21K *1/58*

U.S. Cl. 10—27 E **4 Claims**

1. A method of forming a rivet comprising,

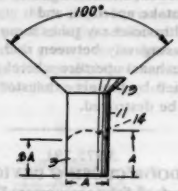
preparing an integral cylindrical blank of an alloy consisting essentially of about 55% titanium and about 45% columbium and of substantially uniform diameter,

locating said blank in a die bore having a cylindrical portion of slightly larger diameter than that of said blank, and an enlarged portion at one end of the cylindrical portion conforming to the shape of a rivet head,

placing an abutment in said cylindrical portion spaced from the enlarged portion to a distance equal to the length of a ductile tail of a rivet,

cold forming into a rivet head the entire blank portion in said enlarged portion,

removing said abutment from the end of said blank,



further cold working said rivet head by extrudng a predetermined portion of said head into said cylindrical bore to form a shank having a first portion work hardened to a predetermined length, and a second portion comprising a ductile tail of a length, approximately 0.8 to 1.00 of the diameter of said shank which is capable of being formed into a buck tail.

3,975,787

METHOD FOR MAKING SELF-LOCKING INTERNALLY THREADED FASTENERS WITH RING-LIKE SELF-LOCKING ELEMENTS

Richard S. Newnom, Tujunga, Calif., assignor to Amerace Corporation, New York, N.Y.

Continuation of Ser. No. 466,499, May 2, 1974, abandoned. This application Dec. 5, 1975, Ser. No. 637,989

Int. Cl.² B21D *53/24*; B21K *1/64*

U.S. Cl. 10—86 A **11 Claims**

1. A method of converting a nut having an imperforate wall providing the nut with external wrenching surfaces and an internal thread-defining surface open at both ends into a self-locking nut of the prevailing torque type in which the self-locking characteristic is derived from a patch of plastic material adhered to said thread-defining surface, said patch being of a predetermined circumferential extent which is greater than 180° and further being axially limited so as to be spaced from both axial ends of said thread-defining surface, said method comprising:

seating the nut, either end first, upon a pin having a cavity-forming portion such that the pin enters one of the open ends of the thread-defining surface so that the pin is received within the thread-defining surface of the nut with said portion of the pin and a portion of the thread-defining surface of the nut establishing a cavity having an opening at the other open end of the thread-defining surface of the nut, the cavity further having a circumferential extent at least as great as said predetermined circumferential extent;

thereupon inserting a quantity of powder of said plastic material through said opening into said cavity and upon a portion of the thread-defining surface of the nut, to establish an initial deposit having at least predominantly a circumferential extent which is less than 180° and which is significantly less than said predetermined circumferential extent;

subsequently, and while said nut remains seated upon said pin, re-distributing plastic powder within the cavity to increase the circumferential extent of the powder to establish a final deposit of plastic powder substantially having said predetermined circumferential extent; and

thereupon heating the nut to fuse the final deposit and establish said patch.

3,975,788

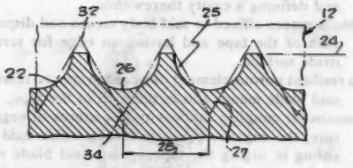
METHOD OF FORMING A THREADED FEMALE FASTENER

Richard L. Reynolds, Palos Verdes, Calif., assignor to Litton Fastening Systems, Lakewood, Calif.

Filed Nov. 15, 1974, Ser. No. 524,163

Int. Cl.² B21D *53/24*; B23G *7/00*

U.S. Cl. 10—86 A **3 Claims**



1. A method of forming a threaded female fastener, comrising the steps of:

a. forming a partial internal helical thread in the female fastener, where said internal helical thread includes

1. a complete internal helical thread crest
2. an incomplete internal thread root with a rounded root contour between adjacent turns of said female fastener thread, and
3. a first width between opposite internal thread flanks greater than that required for a complete internal helical thread, and
4. a second width between opposite internal thread flanks less than that required for a complete internal helical thread, and

b. reforming said partial helical threads into a complete internal helical thread by threading a threaded male fastener having a complete external helical thread, having a diameter greater than the outside diameter of said rounded root contour, into the female fastener including the steps of:

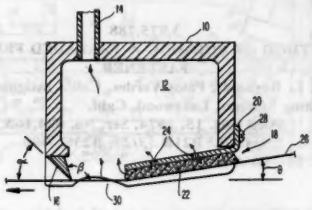
1. pushing fastener material from said rounded root contour thereby developing a complete internal thread root with a sharp, pointed valley,
2. receiving said fastener material from said rounded root contour at said opposite internal thread flanks having said second width, and
3. forming said received fastener material into a final width between said opposite internal thread flanks where said final width is that required for the complete internal helical thread.

3,975,789

COMPLIANT TAPE CLEANER FOR MAGNETIC RECORDING TAPES

Howard L. Derby; August P. Epina, both of Boulder; Dennis R. Olmsted, Broomfield; Sanford Platter, and Zoltan L. Herger, both of Boulder, all of Colo., assignors to Storage Technology Corporation, Louisville, Colo.

Filed Apr. 3, 1975, Ser. No. 564,684
Int. Cl.² B08B 5/04
U.S. Cl. 15—306 A 11 Claims



6. Cleaning apparatus for removing foreign matter from the oxide surface of a length of moving magnetic tape, comprising:

body means disposed adjacent the path of the moving tape and defining a cavity therewithin;

blade means affixed to said body means and disposed in the path of the tape and having an edge for scraping said oxide surface;

a resilient porous element disposed in spaced relationship to said blade means and in the path of the tape;

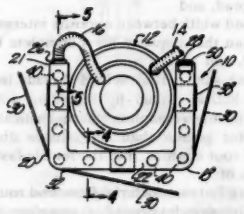
means for coupling said cavity to a source of negative pressure, the negative pressure arising within said cavity assisting in urging the tape against said blade means and said porous element and creating a pressure drop across at least a portion of said porous element.

3,975,790

CLEANING APPARATUS HAVING ULTRAVIOLET LAMP FIXTURE

Lawrence Patterson, 28745 Berrywood Lane, Farmington Hills, Mich. 48024

Continuation-in-part of Ser. No. 514,600, Oct. 11, 1974, which is a continuation-in-part of Ser. No. 374,576, June 28, 1973, Pat. No. 3,846,072. This application Jan. 2, 1975, Ser. No. 537,917
Int. Cl.² A47L 7/04
U.S. Cl. 15—339 4 Claims



1. An ultraviolet light fixture attachment for converting a conventional vacuum cleaner into a germicidal unit, said fixture comprising:

an enclosed housing, the opposite ends of said housing providing respectively an air intake aperture and an air exhaust aperture, said housing defining an air passageway between said air intake and exhaust apertures;

means for releasably attaching said housing to the exterior of a conventional vacuum cleaner for converting said vacuum cleaner into a germicidal unit;

conduit means for channeling the air exhausted from said connected vacuum cleaner into said housing through said housing air intake aperture; and

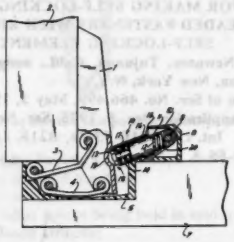
a plurality of ultraviolet ray tubes mounted in said housing in said air passageway between said air intake aperture and said air exhaust aperture whereby airborne microorganisms carried by the air exhausted from said vacuum cleaner may be destroyed.

3,975,791

DOOR CLOSING DEVICE

Anton Hettich, Herford-Schwarzenmoor; Udo Stellbrink, Stift-Quernheim, and Gunter Sundermeier, Bunde-Dunne, all of Germany, assignors to Kunststoff GmbH, Herford, Germany

Division of Ser. No. 57,412, June 8, 1970, Pat. No. 3,772,736. This application Aug. 30, 1973, Ser. No. 393,144
Claims priority, application Germany, June 10, 1969, 6923018
Int. Cl.² E05F 1/12
U.S. Cl. 16—72 10 Claims



1. In a piece of furniture, a combination comprising a wall; a door carried by said wall; a hinge mounting said door on said wall, said hinge including a hinge strap mounting said door for swinging movement about a first axis between an open and a closed position; a housing having a housing section recessed in said door and provided with an opening at an inner side of said door and adjacent said hinge strap; an elongated stud on said door, said stud having an end outside said housing section and remote from said hinge strap which is mounted for pivoting movement about a second axis substantially parallel to but spaced from said first axis, said stud also having a free end facing toward said hinge strap; biasing means acting upon said stud lengthwise of the same and biasing at least part of said stud transversely of said second axis and of said opening in the direction of said hinge strap, said free end of said stud moving to a position in which it engages said hinge strap and biases said door to said closed position only in an initial phase of movement of said door towards said open position and in a terminal phase of movement of said door towards said closed position; and means associated with said stud for limiting movement of said stud in lengthwise direction thereof so as to permit engagement of said free end of said stud with said hinge strap only in said initial and terminal phase of movement.

3,975,792

DOUBLE TRACK DRAPERY GUIDE ASSEMBLY

Richard W. Janson, Box 8110, Canton, Ohio 44711

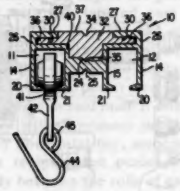
Filed Dec. 31, 1974, Ser. No. 537,694
Int. Cl.² A47H 1/04
U.S. Cl. 16—87.4 R 22 Claims

1. A traverse rod for supporting curtains and the like which comprises:

a pair of spaced apart elongated tracks, each track comprising an upper horizontal wall, a pair of vertical side walls

depending from said upper wall, and horizontal flange members extending inwardly from each said side wall to define a slot, said flange members each receiving movable supporting members which include hanger means depending therefrom through said slot;

an elongated relatively thick single horizontal bar connecting said tracks in parallel rigid relationship, said bar including an elongated groove in its lower side midway between said tracks and parallel thereto, said tracks being separated except for the connection of said horizontal bar;



a lug extending upwardly from an outer sidewall of each said track, each said lug being elongated in a direction parallel to each said track and rigidly connected thereto, a pair of horizontal flanges, each said flange rigidly connected to said lug and extending inwardly towards the other said flange, said flanges with the upper horizontal walls of said tracks forming a pair of horizontally disposed recesses adapted to receive members for supporting the traverse rod, said lugs and said flanges comprising means structurally adapted for supporting the traverse rod and the curtains supported thereby.

3,975,793

EASY-LOCK REMOVABLE DOOR HINGE

Anthony H. Just, Univac Park, P.O. Box 3525, St. Paul, Minn.

Filed Aug. 13, 1975, Ser. No. 604,414

Int. Cl.² E05D *1/06*

U.S. Cl. 16—171 **2 Claims**

1. A hinge arrangement for facilitating the removal of a door from a cabinet, comprising in combination;

first hinge means connecting the door at its upper end to the cabinet,

second hinge means connecting the door at its lower end to the cabinet,

said second hinge means comprising;

a first plate having a hole and a slot extending from said hole opening toward the cabinet when the door is in the 90° open position,

said slot having a width less than the diameter of said hole,

a second plate secured to and extending from the cabinet supporting the weight of the door,

said second plate having a pin secured therein and normally extending into said hole,

said pin having a diameter less than the diameter of said hole but greater than the width of said slot,

the upper portion of said pin being cut out to a width less than the width of said slot to permit the door to be removed from the lower end of the cabinet only when the door is in the 90° open position and lifted to a point where said cut out portion of said pin aligns with said slot,

said first hinge means including means for releasing the upper part of the door from the cabinet when the lower part of the door has been removed from the cabinet.

3,975,794

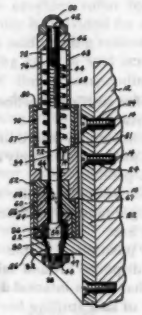
SPRING HINGE

Kenneth L. Kaiser, North Hudson, and William Stowik, Hudson, both of Wis., assignors to Vollrath Refrigeration, Inc., River Falls, Wis.

Filed Nov. 22, 1974, Ser. No. 526,087

Int. Cl.² E05F *1/08*

U.S. Cl. 16—189 **8 Claims**



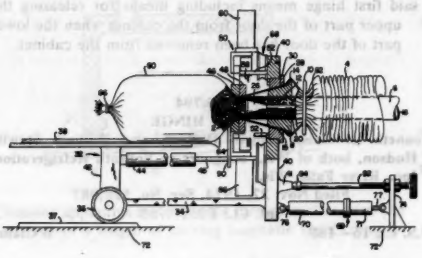
5. In a hinge having a fixed hinge element and having a swingable hinge element for movement between an open and a closed position, having a pin non-rotatably fixed at its inner end to said fixed hinge element and having an outer portion projecting therefrom, having a fixed cam element surrounding the inner end of said pin, and said swingable hinge element having a tubular portion surrounding said pin for pivotal movement around the longitudinal axis of the pin and being axially shiftable, and said tubular portion having a cam element positioned for co-action with the cam element of the fixed hinge portion, the improvement comprising a coiled wire torsion-compression spring surrounding an outer portion of said pin and having one end of its wire anchored to the tubular portion of the swingable hinge element and having its other end interlocked with said non-rotatable pin, said spring being positioned to be compressed in an endwise direction when the tubular portion shifts axially as a result of cam action, and swingable movement of the swingable hinge element also causing twisting of said spring simultaneously with the compression thereof, a cap on the outer end of said pin surrounding said spring, threaded means for maintaining said cap in selected position on said pin, and means between said cap and the outer end of said spring for limiting movement of the adjacent end of the spring.

3,975,795

PRODUCT STUFFING APPARATUS AND METHOD

Vytautas Kupcikevicius; Joseph A. Nausedas, and Vytas A. Raudys, all of Chicago, Ill., assignors to Union Carbide Corporation, New York, N.Y.

Filed Jan. 20, 1975, Ser. No. 542,601
Int. Cl.² A22C 11/02
U.S. Cl. 17—41 11 Claims



1. An apparatus for stuffing flowable product into shirred tubing which comprises:

a. a stuffing horn having an inlet end for receiving flowable product from a pressurized supply and a discharge end for discharging the product;

b. a collar concentrically centrally detachably secured on said horn having a tapered surface portion proximal said horn discharge end;

c. a rim portion positioned at the aft end of said collar concentrically disposed around said horn;

d. a first annulus having an internal diameter larger than the outer diameter of said stuffing horn and smaller than the outer diameter of the rim, said annulus being loosely centrally disposed on said horn intermediate said rim and said horn inlet end to define a passage through which tubing being stuffed can be constricted to effectively provide primary depleating of the tubing whereupon the tubing can then be advanced toward and over said rim to effectively provide secondary depleating and unfolding of the tubing;

e. a second annulus removably centrally aligned with said stuffing horn having a tapered inner surface adapted to mate with said tapered surface portion of said collar disposed on said horn to define a passage of predetermined spacing proximal said horn discharge end through which tubing being stuffed can be constrained in slipping movement as it is being stuffed with a pressurized flowable product;

f. means to intermittently advance and retract said second annulus to and from the mating arrangement with said collar;

g. product stoppering means adapted to be indexed to a first position so as to allow the passage of pressurized product out through the discharge end of the stuffing horn and then to be indexed to a second position so as to prevent the flow of pressurized product out through said discharge end of the stuffing horn; and

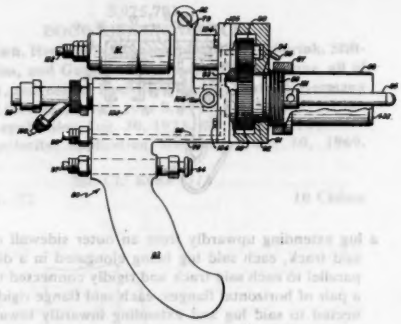
h. means to index said stoppering means selectably at said first and second positions.

3,975,796

SYSTEM FOR DRESSING POULTRY, ANIMALS AND THE LIKE

Joseph A. LaBarber, Kern City, Calif., assignor to Nebraska Technical Equipment Company, Aurora, Nebr.

Continuation-in-part of Ser. No. 351,906, April 17, 1973, Pat. No. 3,921,255, which is a continuation-in-part of Ser. No. 265,953, June 23, 1972, Pat. No. 3,786,535. This application June 11, 1973, Ser. No. 367,354
Int. Cl.² A22C 21/06
U.S. Cl. 17—45 15 Claims



1. A system for dressing poultry, animals and the like, comprising:

a. at least one dressing tool having a rotatable circular cutting blade means and a structural configuration effective to be held in the hand of an operator for removing the alimentary canal and anus from a carcass,

b. a compressed air source and a vacuum source and means connecting said dressing tool to said sources,

c. said dressing tool including an elongated probe means coaxially disposed within said rotatable cutting blade means so that a cutting chamber is defined by the space between the probe means and the rotatable cutting blade means,

d. means for rotating the cutting blade means, and

e. automatic programmed control means for drawing a vacuum on the cutting vacuum chamber at the same time that the cutting blade means is being rotated,

f. a single trigger movable between a depressed and released position for activating said programmed control means,

g. said dressing tool being connected to each of the compressed air and vacuum sources for a time period while the trigger is in the depressed position and being connected to the atmosphere when the trigger is in the released position immediately after having been depressed,

h. said programmed control means including an air fluidic mechanism having valves disposed at a location away from the dressing tool between said dressing tool and said compressed air and vacuum sources for controlling the flow of compressed air and vacuum during a working cycle of the dressing tool.

3,975,797

SHRIMP PROCESSING APPARATUS

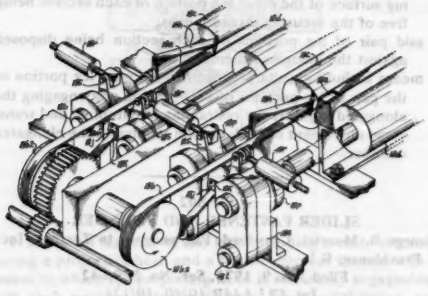
Eldon L. Grimes, Seattle, Wash., and Kenneth W. Bullock, Gearhart, Oreg., assignors to Marine Construction & Design Co., Seattle, Wash.

Filed Mar. 22, 1974, Ser. No. 453,565
Int. Cl.² A22C 29/00
U.S. Cl. 17—73 15 Claims

1. In apparatus for peeling shrimp and similar articles including a pair of peeler rolls arranged parallel in a generally horizontal tier, an associated horizontally extending, vertically reciprocated peeler bar interposed operatively between the

rolls and having opposed curved peeler surfaces facing the respective rolls to effect peeling of the shrimp in the nips therebetween, means associated with the bar to advance the shrimp unidirectionally lengthwise of the rolls; at each end of said tier a cam connected to be reciprocated vertically with the peeler bar and having opposed vertically curved cam surfaces, and pairs of cooperable cam followers respectively engaging the cam surfaces of the respective cams, the cam followers being operatively connected to the respective peeler rolls at the ends of the tier to position the ends of the rolls relative to the associated bar during bar reciprocation, at least one such cam being tapered in width longitudinally of the bars, and means to selectively adjust the position of the cam followers associated with the tapered cam along the cam taper, thereby to selectively vary the nip spacings between said peeler rolls and bar at the associated end of the tier.

8. Apparatus for peeling shrimp and similar articles including a main frame, a primary peeler section mounted at a relatively elevated position in said main frame and comprising a plurality of pairs of driven primary peeler rolls arranged parallel in a generally horizontal tier, associated horizontally extending, vertically reciprocated peeler bars respectively interposed operatively between the rolls of each pair to effect primary peeling of the shrimp in the nips therebetween, means



to distributively deposit unpeeled shrimp upon the primary peeler roll pairs at one end of said primary peeler section, means associated with the respective bars to advance the deposited shrimp unidirectionally lengthwise of the pairs of primary peeler rolls from said end during peeling, a polishing peeler section mounted in said main frame substantially congruently beneath said primary peeler section and comprising a plurality of pairs of driven polishing peeler rolls arranged parallel in a generally horizontal tier, horizontally extending, vertically reciprocated peeler bars respectively interposed operatively between the rolls of each polishing peeler roll pair to effect polishing of the peeled shrimp in the nips therebetween, means mounted in said main frame receiving shrimp peeled by said primary peeler section and distributively depositing the same upon the polishing peeler roll pairs at one end of the polishing peeler section, means associated with the respective latter bars to advance the shrimp unidirectionally lengthwise of the pairs of polishing peeler rolls from said one end of the polishing peeler section during polishing, a drive motor, and separate drive means drivingly connecting said drive motor respectively to the peeler bars of the primary peeler section and also to the peeler bars of the polishing peeler section, said respective drive means being adjustable to permit independent selection of the stroke of such primary peeler bars and the stroke of such polishing peeler bars.

3,975,798

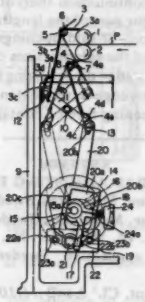
SAFETY DEVICE OF A CARDING MACHINE PROVIDED WITH A PAIR OF CRUSHING ROLLERS

Takashi Katoh, Kariya; Hideo Hidaka, Aichi, and Singo Oda, Nagoya, all of Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Japan

Filed Dec. 18, 1974, Ser. No. 533,950

Int. Cl.² D01G *15/96*

U.S. Cl. 19—98 **6 Claims**



1. Safety device of a carding machine provided with a pair of crushing rollers wherein a scraping plate is urged to a cylindrical surface of each crushing roller for the entire length thereof and a main motor is provided for driving said carding machine together with said crusing rollers; comprising thereabout, means for urging each of said scraping plates to the cylindrical surface of the corresponding crushing roller, means for simultaneously positioning said scraping plates in contact with said crushing rollers or in a position spaced from said crushing rollers alternatively, means for actuating said setting means, an electric switch to open a circuit between said main driving motor and an electric source when said setting means positions each scraping plate to said spaced position from the corresponding crushing roller, respectively or to close the circuit when said setting means positions each scraping plate in contact with the corresponding crushing roller.

3,975,799

ANCHORAGE ASSEMBLY FOR USE IN THE PRESTRESSING OF CONCRETE STRUCTURES

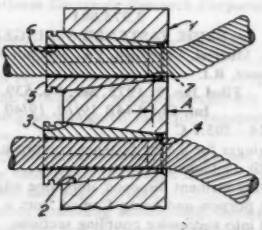
Robert Michael Kerr, Leeds, England, assignor to CCL Systems Limited, Surbiton, England

Filed Aug. 13, 1974, Ser. No. 497,125

Claims priority, application United Kingdom, Aug. 23, 1973, 39936/73

Int. Cl.² F16G *11/04*

U.S. Cl. 24—122.6 **7 Claims**



1. An anchorage assembly for pre-stressed concrete structures, comprising an integral bearing plate having substantially planar end wall and a plurality of transverse openings having

parallel axes with each of said openings extending through said planar end wall being adapted to receive a stranded stressing element, and each of said openings, in the position of use in a stressed concrete structure, lying at an angle to the axis of its co-acting stressing element at the point where said stressing element extends out of said bearing plate planar end wall, a frusto-conical wedge device having an axial bore and being positioned between the wall of each of said openings and its co-acting stressing element, each of said openings being in the form of a frusto-conical portion and a cylindrical portion arranged in continuation thereof, said frusto-conical portion forming a major part of the length of said opening and said cylindrical portions of said openings being closely adjacent said end wall, and the relative sizes of each of said openings and its co-acting wedge device being such that the leading or narrow end of said wedge device extends into said cylindrical portion of said opening free of contact therewith.

3,975,800

BELT STRAP ADJUSTING DEVICES

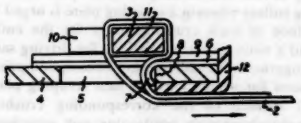
Stig Axel Goran Farlind, Monsteras, Sweden, assignor to Stece - AB Industrifjadrar, Monsteras, Sweden

Filed Feb. 14, 1975, Ser. No. 550,027

Claims priority, application Sweden, Feb. 27, 1974, 7402582

Int. Cl.² A44B *11/10*

U.S. Cl. 24—196 **4 Claims**



1. A device for adjusting a strap of a safety belt for vehicles and like craft, said device being a latch in the form of a bar which is transversely movable with respect to a base plate formed with an opening which is associated with the bar and through which the strap is passed about the bar for clamping the strap between the bar and the base plate when the strap is subjected to pull, said bar being adapted, at a heavy pull at the strap, to be shifted laterally of the opening in the direction of pull, wherein the belt strap adjusting device has between the base plate and the bar a thin flat member which is associated with the base plate and adapted, at a heavy pull at the strap, to be carried along by the bar when the latter is shifted laterally of the opening, said flat member lying at said shifting movement between the strap and the base plate so that the strap is protected against abrasion under the heavy load, said flat member being a metal sheet having a bent edge portion which is adapted to grasp the edge of the opening cooperating with the strap, said bent edge portion being disposed to be straightened when the flat metal sheet member is carried along by the bar in the shifting movement thereof.

3,975,801

SLIDE FASTENER STRINGER

George B. Moertel, Crawford, Pa., assignor to Textron, Inc., Providence, R.I.

Filed Jan. 9, 1975, Ser. No. 539,643

Int. Cl.² A44B *19/10*, *19/40*

U.S. Cl. 24—205.1 C **16 Claims**

1. A stringer for a slide fastener comprising

a tape-like attachment portion;

a coupling element disposed along one edge of the attachment portion and being formed from a continuous filament into successive coupling sections;

each section having a head portion, a pair of elongated leg portions extending from opposite sides of the head portion, and a connecting portion interconnecting to a leg portion of an adjoining section;

both of said pair of leg portions of each section extending over one side of the attachment portion adjacent the one edge of the attachment portion with one of the pair of leg portions engaging the attachment portion;

an elongated member extending parallel to the attachment portion longitudinally throughout the length of the coupling element and transversely between the pair of leg portions of each section such as to maintain the pair of leg portions of each section in spaced relationship;

thread means passing through the attachment portion and around at least one of the elongated member and the one

leg portion of each section for securing each section to the one side of the attachment portion, the outward facing surface of the other leg portion of each section being free of the securing thread means;

said pair of leg portions of each section being disposed against the elongated member; and

means including a sharp edge formed on a leg portion of the pair of leg portions of each section and engaging the elongated member for restraining longitudinal and transverse movement of each section relative to the elongated member.

3,975,802

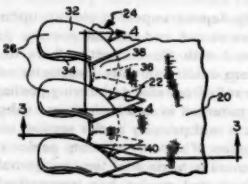
SLIDER FASTENER AND STRINGER

George B. Moertel, Crawford, Pa., assignor to Textron, Inc., Providence, R.I.

Filed Jan. 9, 1975, Ser. No. 539,642

Int. Cl.² A44B *19/40*, *19/12*

U.S. Cl. 24—205.16 C **15 Claims**



1. A stringer for a slide fastener comprising

a support member formed from a material folded at one edge and having opposite folded portions secured together;

said support member having a plurality of spaced slots formed in the material transversely over the one edge defining looped strap portions extending over the one edge between the slots;

said looped strap portions having a width substantially greater than the width of the slots;

a spiral coupling element formed from a continuous filament into successive convolutions;

each convolution having a head portion extending from the one edge of the support member for interlocking with

opposing head portions, a pair of leg portions extending from opposite sides of the head portion into a respective slot in the one edge, and a heel portion extending through a looped strap portion and interconnecting to a leg portion of an adjacent convolution; and

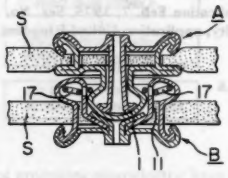
said slots being formed in the support member at an oblique angle to the one edge such that opposite halves of each slot receive the respective leg portions of each pair of leg portions at respective longitudinally spaced points on the one edge of the support member.

3,975,803

FASTENING SNAP

Morio Katayama, Tokyo, Japan, assignor to Gondra Industries & Co., Japan

Filed May 16, 1975, Ser. No. 578,360
Claims priority, application Japan, May 21, 1974, 49-57061
Int. Cl.² A44B 17/00
U.S. Cl. 24—217 R **5 Claims**



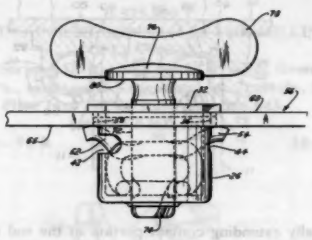
1. In a snap fastener of the type including a male member having a projecting head and a female member formed with a recess in which the projecting head is releasably engageable, with each member being constituted by a metal fitting, engageable with one surface of a sheet of material, and a metal washer, engageable with the other surface of the sheet, with the metal fitting and metal washer being secured to each other by piercing means extending through the sheet, to clamp the sheet therebetween, the improvement comprising, in combination, the metal washer of each said male and female members being formed with a disc portion having a short tube extending perpendicularly from the center thereof and constituting a sheet piercing means; the metal fitting of each of said male and female members being formed with a central hollow portion defining a recess having a central opening for projection of the tube of the associated washer into said central hollow portion during assembly of the respective member to the sheet; one of the two parts of each of said male and female members being formed with a peripheral portion curved on itself to define an annular groove opening toward the other part of the associated member; the other of the two parts of each of said male and female members being formed with barbs projecting vertically therefrom adjacent its periphery and constituting sheet piercing means engageable in said annular groove during assembly of the respective member to the sheet; whereby, upon assembly of each member to the sheet, the associated tube may be crimped in the associated central hollow section and the associated barbs may be crimped in the associated annular groove, so that the two parts of each male and female member are firmly anchored to each other at both their center portions and their peripheries to clamp the sheet firmly therebetween.

3,975,804

FRONT INSERT RECEPTACLE

Peter Schenk, West Islip, N.Y., assignor to Dzus Fastener Co., Inc., West Islip, N.Y.

Filed Jan. 14, 1976, Ser. No. 649,203
Int. Cl.² A44B 17/00
U.S. Cl. 24—221 A **16 Claims**



1. A front insert receptacle for fastening two members together comprising:

a housing opened at one end to removably receive a stud therein;

a stop surface on the housing to engage with the upper surface of one member when the receptacle is partially extended through an opening therein;

rotational stop means on the housing to prevent rotation of the housing with respect to the one member when extended therein;

at least one cam slot on the housing and a cam follower on the housing captured by the cam slot and initially in a first position when the housing is inserted in the one member;

biasing means on the housing in engagement with the cam follower and responsive to movement of the cam follower along the cam slot into alignment with a portion of the slot which permits the biasing means to direct a portion of the cam follower into engagement with the undersurfaced of the one member to retain the receptacle in position on the one member;

stud locking means on the housing adapted to engage with a stud after the housing has been mounted on the one member and the stud has been mounted on the other member and inserted into the housing where upon relative rotation of the stud with respect to the housing in one direction will activate the stud locking means and relative rotation of the stud with respect to the housing in a second direction will diactivate the stud locking means and permit the stud to be removed from the housing and the two members to be separated.

3,975,805

SLIDE GUIDE RETAINER

John E. Spurling, Northridge; Jiri G. Hodek, North Hollywood, and Edward J. Kessels, Burbank, all of Calif., assignors to International Electronic Research Corporation, Burbank, Calif.

Filed Aug. 25, 1975, Ser. No. 607,247
Int. Cl.² A44B 21/00
U.S. Cl. 24—248 PC **13 Claims**

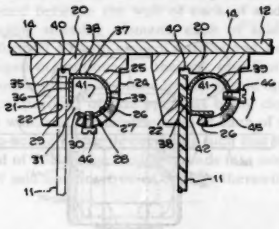
1. A slide guide retainer for gripping a relatively flat edge portion comprising an elongated rack for engagement with said edge portion,

said rack comprising a block having a flange face extending substantially throughout the length of the rack for engagement with said edge portion,

a clamp assembly extending substantially throughout the length of said rack and in spaced relationship with said flange face whereby to provide a slot for reception of said edge portion, said clamp assembly comprising a retention bracket having a captive portion in fixed relationship with

said block, a transversely arcuate free portion providing an arcuate pocket, a rod member rotatably mounted in said pocket,

and resilient cam means acting transversely between the rod member and the free portion of said bracket when the rod member is in one position of rotation whereby a longitudinally extending contact portion of the rod member is adapted to be pressed into engagement with said edge portion, said rod member having another position of rotation wherein a longitudinally extending adjacent portion of the rod member is adapted to occupy a position free of engagement with said edge portion.



3,975,806

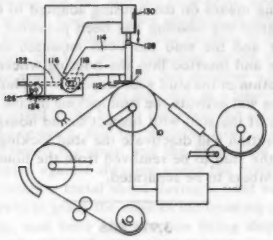
APPARATUS FOR COMPRESSIVELY TREATING FLEXIBLE SHEET MATERIALS

Richard Rhodes Walton, 10 W. Hill Place, Boston, Mass. 21450, and George Ernest Munchbach, 26 June St., Roslindale, Mass. 02131

Division of Ser. No. 330,176, Feb. 7, 1973, Pat. No. 3,869,768, which is a continuation-in-part of Ser. No. 115,606, Feb. 16, 1971, Pat. No. 3,810,280. This application Aug. 14, 1974, Ser. No. 497,314

Int. Cl.² D06C *21/00*

U.S. Cl. 26—18.6 **16 Claims**



1. In apparatus for establishing a continuous longitudinal compressive treatment of a running length of flexible material by pressing it by means of a pressing assembly into driven engagement with a moving drive surface, the pressing assembly providing a confining surface and a retarding surface both opposed to the drive surface and the retarding surface positioned beyond the confining surface so that the material passes between the retarding and drive surfaces after it exits from beneath the confining surface, and wherein the pressing assembly comprises a presser member and coupling means for transmitting the force of the presser member to the material and the coupling means comprises confining means defining the confining surface, retarding means positioned at least in part beyond the confining means and defining the retarding surface and force transmitting means between the presser member and the confining and retarding means, the improvement wherein:

said presser member and coupling means are mounted for movement relative to each other longitudinally of the moving drive surface,

means are provided for effecting such relative movement while said presser member is in pressing engagement with said coupling means, and

said coupling means are so disposed and arranged with respect to said presser member as

during said relative movement in one direction progressively to force said retarding surface closer to said moving drive surface from a relatively remote, ineffective position to positions closer to said drive surface to increase progressively the retarding effect of the retarding surface on a material driven by said drive surface, and

during said same relative movement to transmit sufficient force to the confining surface to maintain material beneath it in non-slipping, driven engagement with said drive surface to the vicinity of the commencement of said retarding surface.

3,975,807

SETTING APPARATUS

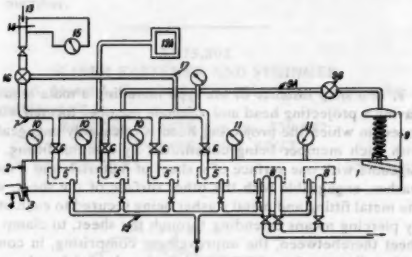
Donald Bramley; Gerald Thomas Davies, and David Watson, all of Doncaster, England, assignors to Imperial Chemical Industries Limited, London, England

Continuation of Ser. No. 279,603, Aug. 10, 1972, abandoned. This application Feb. 7, 1975, Ser. No. 548,126

Claims priority, application United Kingdom, Aug. 4, 1971, 36629/71

Int. Cl.² D02G *1/12*

U.S. Cl. 28—1.6 **5 Claims**



1. Continuous steam setting apparatus for crimped, thermoplastic, filamentary tow, comprising an elongated tube through which the tow is fluidically forwarded, one end of said tube being sealed to the tow exit portion of a stuffer-box tow crimping apparatus said tube consisting effectively of:

a. a fluid section in which steam is introduced into the tube,

b. a venting section in which steam pressure is relieved to atmospheric pressure,

c. a third section from which the discharge of tow takes place, and

d. control systems for simultaneously regulating the flow of steam and discharge of tow, said control systems comprising means for regulating the flow of steam to the tube from a source thereof, and means for simultaneously regulating steam pressure and the discharge of tow from the tube depending upon the pressure of steam therein.

3,975,808

METHOD FOR PRODUCING A KEY WHICH IS TO BE ACTUATED BY WAY OF A PRESSURE FORCE DIRECTIONED AND DIMENSIONED IN A CERTAIN MANNER

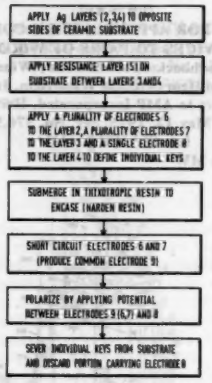
Franz Stangl, Frauental, Austria, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Sept. 11, 1975, Ser. No. 612,573

Claims priority, application Germany, Sept. 25, 1974, 2445805

Int. Cl.² H01L *41/22*

U.S. Cl. 29—25.35 **3 Claims**


APPLY Ag LAYERS (2,3,4) TO OPPOSITE SIDES OF CERAMIC SUBSTRATE
APPLY RESISTANCE LAYER (5) ON SUBSTRATE BETWEEN LAYERS 3 AND 4
APPLY A PLURALITY OF ELECTRODES 6 TO THE LAYER 2, A PLURALITY OF ELECTRODES 7 TO THE LAYER 3 AND A SINGLE ELECTRODE 8 TO THE LAYER 4 TO DEFINE INDIVIDUAL KEYS
SUBMERGE IN THIXOTROPIC RESIN TO ENCASE (HARDEN RESIN)
SHORT CIRCUIT ELECTRODES 6 AND 7 (PRODUCE COMMON ELECTRODE 9)
POLARIZE BY APPLYING POTENTIAL BETWEEN ELECTRODES 9 (6,7) AND 8
SEVER INDIVIDUAL KEYS FROM SUBSTRATE AND DISCARD PORTION CARRYING ELECTRODE 8

1. A method of producing piezoelectric keys each of which are to be actuated by the application of a predetermined and directed force and each of the keys including a body of permanently polarized material which carries electrodes for transfer of electrical voltage and current, each of the bodies having an approximately constant cross section and a thickness d which is small in relation to further dimensions of the body in each plane perpendicular to the direction in which the directed force affects the body, the body polarized in the direction of the thickness d, the electrodes positioned on opposite surfaces of the body at a distance d therebetween, each body polarized over a volume $d \cdot h_2 \cdot l$, where the thickness d is perpendicular to the direction of the force, l is the length of the body perpendicular to the thickness d and perpendicular to the direction of the force and at least a multiple larger than the thickness d, and h_2 is a height dimension of a portion of the body perpendicular to the length l and to the thickness d and approximately ten times the thickness d, the key to be utilized in connection with a low-pass filter which comprises a resistor which is connected in parallel with electrodes carried on the body, the resistor being in the form of a resistance layer carried on the body, comprising the steps of:

applying a continuous first metal layer on one surface of a piezo-ceramic substrate which has a length L which is greater than the length l of a body times the number of bodies to be produced;

applying spaced second and third metal layers on the opposite surface of the substrate;

applying a resistance layer in the space between and contacting the second and third metal layers;

applying first electrodes to the first metal layer spaced apart and equal to the number of keys to be produced;

applying second electrodes to the second metal layer spaced apart and equal in number to the number of keys to be produced;

applying a third electrode to the third layer;

encasing the substrate carrying the first, second and third metal layers in a thixotropic resin;

hardening the resin;

applying an electrical potential between the first and second electrodes and the third electrode to polarize the substrate; and

severing the substrate and metal layers at spaced intervals between each pair of first and second electrodes at distances l.

3,975,809

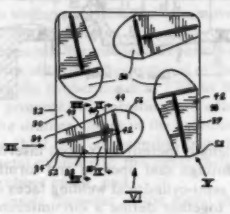
CUTTING INSERT, ESPECIALLY FOR MILLING OPERATIONS

Edward L. Sorice, Crabtree, and Dennis G. Jones, Greensburg, both of Pa., assignors to Kennametal Inc., Latrobe, Pa.

Filed June 13, 1975, Ser. No. 586,643

Int. Cl.² B26D *1/00*

U.S. Cl. 29—95 R **10 Claims**



1. A cutting insert comprising a body of hard wear resistant material having parallel top and bottom faces and a peripheral wall perpendicular to said top and bottom faces, said body being polygonal when viewed in a direction perpendicular to said faces, whereby said peripheral wall is in the form of flat side walls which meet at the corners of the insert and which intersect the top and bottom faces of the insert to form edges on the insert, said corners of the insert being rounded, at least one recess in one of said top and bottom faces extending from a point near a respective corner of the insert along a respective edge of the insert, said recess widening in a direction away from said respective corner and having a first bottom wall inclining downwardly away from the respective edge of the insert and second bottom wall portion extending upwardly from the lower edge of said first bottom wall portion to said plane, both of said first and second bottom wall portions forming skewed planes each making an ever increasing included angle with the plane of the respective face in a direction away from the respective corner of the insert, and said recess comprising an end wall portion on the end thereof remote from said respective corner and extending from the adjacent ends of said first and second bottom wall portions upwardly to said plane.

3,975,810

VALVE HOUSING AND METHOD OF MAKING THE SAME

Walter Siepmann, Belecke, Germany, assignor to Eugen Vogt, Birrwill, Switzerland

Division of Ser. No. 477,493, June, 1974, Pat. No. 3,913,887.

This application June 25, 1975, Ser. No. 590,136

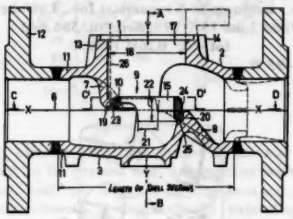
Claims priority, application Germany, June 22, 1973, 2331748

Int. Cl.² B23P *15/00, 13/00;* F16K *27/10*

U.S. Cl. 29—157.1 R **1 Claim**

1. A method of making a valve housing comprising the steps of providing a pair of shell sections each having an open side bounded by a planar edge face, and a semi-circular rib integral with the respective shell section, located within said open side and having an end face substantially parallel to the respective edge face, and displaced in a direction normal to the asso-

ciated edge face from the latter, the ribs being semi-circular in mutual opposite directions, and one of said shell sections having in its wall opposite said open side an opening having a central axis substantially normal to the edge face thereof and a diameter greater than the diameter defined by said ribs together; grinding said edge faces of said shell sections; placing said shell sections together with said open sides juxtaposed and said ground edge faces abutting against each other in a plane, with said end faces of said ribs located to opposite sides of said plane; welding said shell sections together at said edge faces by a weld seam; examining the thus-formed weld seam



over the whole length thereof by x-rays; inserting a material removing tool through said opening and forming with it respective at least semi-cylindrical welding faces on the respective ribs, which together define a circumferentially annular face of in part Z-shaped stepped configuration; inserting through said opening an annular valve seat forming member of similarly substantially Z-shaped configuration and positioning it on said annular face; and welding said annular valve seat forming member to said annular face by means of an electron beam passing through said opening parallel to the central axis thereof.

3,975,811

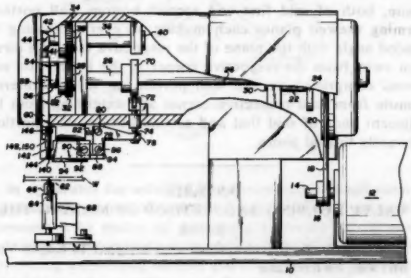
AUTOTAB MACHINE

H. T. Meyer, Liverpool, N.Y., assignor to General Staple Company, Inc., New York, N.Y.

Filed Oct. 30, 1974, Ser. No. 519,235

Int. Cl.² H05K *3/00*

U.S. Cl. 29—203 B **11 Claims**



1. Apparatus for inserting terminals into a workpiece; said apparatus comprising

feeding means for sequentially advancing a supply strip of integrally connected preformed terminals toward a first station of said apparatus;

grasping means for grasping the leading one of said terminals at said first station and for maintaining a grasp on said one of said terminals until said terminal is inserted in said workpiece;

shearing means for severing said leading one of said terminals from the remainder of said supply strip; and

driving means operable to drive said grasping means toward said workpiece for insertion of said terminal therein;

wherein said grasping means solely comprises first and second grasping plates normally biased apart to define a reception space for said leading one of said terminals and further comprising actuating means for urging said grasping plates toward one another to grasp said leading one of said terminals therebetween for a preselected period of time; and

wherein said shearing means comprises a shearing edge passed by one of said grasping plates as they are urged toward one another by said actuating means.

3,975,812

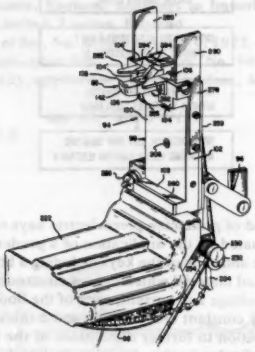
APPARATUS FOR APPLYING WIRE CONNECTING DEVICES TO PAIRS OF WIRES

James Earl Fleischhacker, Clearwater; Vincent Nicholas, Brooksville, and Henry George Wasserlein, Jr., Seminole, all of Fla., assignors to AMP Incorporated, Harrisburg, Pa.

Filed May 12, 1975, Ser. No. 576,932

Int. Cl.² H01R *43/04*

U.S. Cl. 29—203 MW **11 Claims**



1. Apparatus for repetitively connecting the corresponding wires of two pairs of wires to each other in separate electrical connections by means of connecting devices which have wire receiving ends, said ends facing in opposite directions, each of said ends having a wire connecting means therein, said devices being removably mounted on a continuous carrier strip in spaced-apart relationship with said wire-receiving ends facing laterally of said carrier strip, said apparatus comprising:

frame means having an operating zone,

strip feeding means for feeding said strip along an operating zone strip feed path which extends through said operating zone from one end thereof to the other end thereof, said one end of said zone being proximate to an operator's position for said apparatus and said other end being remote from said operator's position,

first and second bundle supporting means, said first bundle supporting means being on a first side of said strip feed path and said second bundle supporting means being on the second side of said path, said bundle supporting means having supporting means for supporting first and second bundles of wire pairs with said pairs extending generally towards said operator's position,

first and second wire insertion stations in said operating zone on said first and second sides of said path respectively, said insertion stations being between said one end and said other end of said zone, said insertion stations having inserting and trimming means for trimming wires which extend normally of said path and inserting said

wires into a connecting device positioned at said insertion station, and

pair guiding means proximate to said one end of said zone, said guiding means having surface portions for separating the wires of a pair and guiding one of said wires to each of said insertion stations whereby,

a pair of wires from a bundle on either of said bundle supporting means can be connected to connecting means in the wire-receiving ends of a connecting device at said insertion situation by moving said pair from the bundle to and over said guiding means so that one wire is at each of said insertion stations and then actuating said trimming and inserting means.

3,975,813

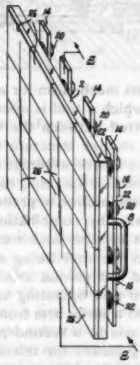
MAGNETIC TILE HOLDER

William A. Bell, 286 Rosemont Gardens, Lexington, Ky. 40503

Filed Nov. 12, 1975, Ser. No. 631,320

Int. Cl.² B25B *27/00*

U.S. Cl. 29—270 **3 Claims**



1. A holder for releasably holding a plurality of tiles in predetermined array comprising:

a generally planar base member having spaced magnetic means dispersed throughout the area thereof for holding a plurality of magnetically attractable tiles on a forward face thereof; and

selectively operable means movable forwardly through said base member to engage tiles thereon and push said tiles from said base member against the action of said magnetic means, said last named means comprising a plurality of pins slidable forwardly through said base member between said magnets, and

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3,975,814

RESTORATION OF SUCTION PRESS SHELLS

Sidney Stewart Harrowing, 949 Main St. East, Farnham, Quebec, J2N 2R6, Canada

Filed May 27, 1975, Ser. No. 581,228

Int. Cl.² B22D *19/10;* **B23P** *7/00*

U.S. Cl. 29—401 F **24 Claims**

1. A process for restoring a suction press shell used in the removal of water in the formation of paper sheets, said shell consisting of a metal cylinder bonded with a rubber cover and perforated by multiple drainage holes which extend from the inner surface to the outer surface of the shell, the inner surface of the metal cylinder being worn and having lost its uniform aspect, the process comprising the steps of:

cleaning and roughening the outer metal surface of the cylinder,

winding under tension on the outer surface of the cylinder successive layers of a woven glass or synthetic fibre tape from 2 to 6 inches wide after impregnating the tape with a concentration of 35 to 55% of thermosetting resin until the required thickness of the tape for stiffening the cylinder within acceptable deflection limits is reached, each layer of tape overlapping the preceding layer by 25 to 90% at an angle of wrap of 5° to 15°,

winding a reinforcing layer of a transparent cellulose film from 2 to 6 inches wide over the resin impregnated layers,

heat treating the cylinder thus wrapped with the cellulose film at a temperature ranging from 212° to 300°F. for 2 to [hours to harden said layers of tape,

grinding or tooling the outer surface of the cylinder thus heated to uniform surface and to remove the transparent cellulose film therefrom,

applying a specially formulated rubber cover over the outer surface thus obtained after removal of the cellulose film,

heat treating the rubber cover at 270° to 300°F. for 8 to 20 hours to promote vulcanization and adhesive reaction,

redrilling the drainage holes of the cylinder thus completed to restore their normal extension from the inner surface of the metal cylinder to the outer surface of the newly bonded rubber cover, and

boring the inside diameter of the metal shell to a uniform surface.

3,975,815

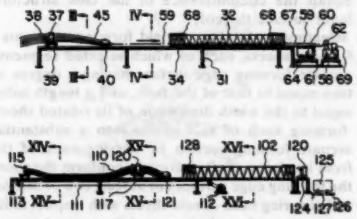
METHOD OF INSERTING TENSION WIRES IN THE PROCESS OF WIRE ASSEMBLING

Takemitsu Mori, Hachioji, Japan, assignor to Nippon Concrete Industries Co. Ltd., Tokyo, Japan

Filed Dec. 30, 1974, Ser. No. 537,365

Int. Cl.² B23P *19/04*

U.S. Cl. 29—433 **4 Claims**



1. A method of inserting tension wires within a wire cage for facilitating the process of wire assembling for a concrete pole, pile, or the like, comprising the steps of:

placing a wire-clamping chuck upon a channel guide provided upon the upper surface of a main body stand;

drawing a tractive member out from drawing equipment and passing the same through said wire cage so as to be connected to the front end of said chuck;

inserting said tension wires through a carriage so as to be movably supported thereby and disposing the front ends of said wires within said chuck;

interposing said front ends of said wires between a fixed, annular, tapered wall of said chuck and a threadedly rotatable, linearly movable plate member;

rotating said plate member so as to linearly move the same toward said fixed, annular wall member of said chuck so as to fixedly grip said front ends of said wires therebetween;

actuating said drawing equipment so as retract said tractive member and draw said chuck and said wires through said cage;

removing said wires from said chuck;

upsetting the forward ends of said wires so as to form rivets thereon; and

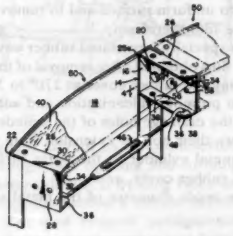
fixing said rivet ends of said wires within said cage.

3,975,816

METHOD FOR MAKING FIBER REINFORCED RESIN TANK FORMING MANDREL

Frank A. Carter, Ferndale, Wash., assignor to Ershig's, Inc., Bellingham, Wash.

Filed Dec. 10, 1974, Ser. No. 531,302
Int. Cl.² B23P 11/02
U.S. Cl. 29—446 8 Claims



1. A method of making a mandrel for forming a fiber reinforced resin tank structure, said method being readily adapted for making tank structures of larger or smaller diameters, where the tank structure being made has a cylindrical configuration of a preselected diameter, circumference and degree of curvature, said method comprising:

a. providing a plurality of substantially planar forming sheets, each of which is readily bendable into a curve about a vertical axis, each of said sheets having a predetermined lateral dimension, the total of which dimensions equals the circumference of the tank structure at the inner surface thereof;

b. selecting a plurality of rigid forming segments for said forming sheets, each of which selected segments has an arcuate forming edge surface having a degree of curvature equal to that of the tank, and a length substantially equal to the width dimension of its related sheet,

c. forming each of said sheets into a substantially rigid arcuate forming section by curving each of the sheets from its planar configuration to conform the sheet against the forming edge surfaces of at least two of said segments, and securing each of said sheets with respect to its related segments, with each sheet and its secured segments thus comprising a forming section having a degree of curvature closely corresponding to that of the tank structure being formed,

d. accurately locating the forming sections, vertically erect and proximate one another, along a base circumference location of a closed circle corresponding to the circular connfiguration of the inner surface of the tank to be formed,

e. providing at the vertical edge portions of each forming sections locating means having a predetermined rigidly fixed angular relationship with its related section, and

f. rigidly interconnecting each of said forming sections to its two adjacent sections to form a substantially rigid forming cylinder having a continuous outer cylindrical surface corresponding within close tolerances to the inner surface of the tank to be formed,

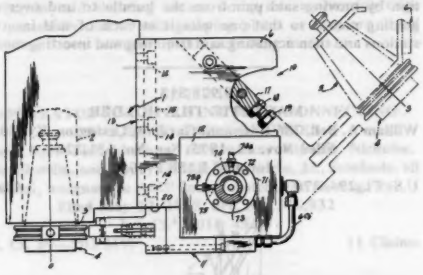
whereby fiber reinforced resin material can then be laid against said cylindrical surface to form said tank structure.

3,975,817

FLUID-ACTUATED TOOL CHANGER WITH DUAL AXIS OF ROTATION

James L. Frazier, Los Alamitos, Calif., assignor to Houdaille Industries, Inc., Buffalo, N.Y.

Filed Oct. 9, 1974, Ser. No. 513,405
Int. Cl.² B23Q 3/157
U.S. Cl. 29—568 14 Claims



1. In a tool transport mechanism for a machine tool having a operating axis on which a tool is operable, and in which a tool is to be transferred between the operating axis of the machine and a tool storage structure having tool-receiving means for supporting a tool on a storage axis, at least a portion of which is spaced from said operating axis, with the tool being supplied to the operating station in predetermined orientation on said operating axis, the combination of a transfer arm, comprising a support member and a cooperable supporting member, the support member being supported for pivotal movement on a fixed first pivotal axis, at least a portion of which is spaced from said operating and said storage axes, means for moving said transfer arm from a first position adjacent said operating axis to a second position adjacent said storage axis, gripping means for releasably gripping a tool positioned either on said operating axis or on said storage axis, comprising a pair of cooperable gripping jaws pivotally supported from said cooperable supporting member, said gripping means including a pair of gripping jaws which are operative to engage cylindrical means on a tool-carrying adapter for approximately half of the circumference of such cylindrical means, such cylindrical means of a tool carrying adapter being provided with a pair of diametrical notches therein, and said jaws are provided with respective inwardly directed projections, each adapted to enter a respective one of said notches, said supporting member being pivotally supported on said support member for pivotal movement thereof and said tool gripping means and a tool carried thereby, about a second pivotal axis extending in a direction transversely to that of said first pivotal axis for selectively orienting said tool-gripping means, and such a tool carried thereby on said operating axis when said arm is in said first position, and on the axis of said tool-receiving means in a relative position corresponding to said predetermined orientation thereof on said operating axis, when said arm is in said second position, whereby said tool is deposited at said tool-receiving means for support thereby, said operating, storage and second pivotal axes lying in a common plane, said first pivotal axis extending perpendicular to such plane and intersecting said second pivotal axis, a power source having a drive member operatively connected with said support member for effecting said pivotal movement thereof, means for effecting pivotal movement of said supporting member relative to said support member about said second pivotal axis, a stationary bevel gear concentric with said first pivotal axis, comprising a second bevel gear rigidly carried by said shaft, with pivotal movement of said arm about said first pivotal axis being operatively transmitted to said shaft, whereby the latter and said gripping means is pivoted about said second axis during movement of said transfer arm

about said first axis, and fluid-actuated means carried by said arm for selectively actuating said gripping means to and from tool-gripping and tool-releasing position.

3,975,818

METHOD OF FORMING CLOSELY SPACED ELECTRODES ONTO SEMICONDUCTOR DEVICE

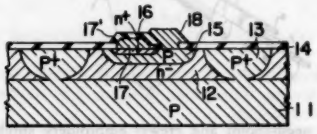
Tadao Kaji, and Takeki Katsube, both of Kokubunji, Japan, assignors to Hitachi, Ltd., Japan

Filed June 26, 1974, Ser. No. 483,356

Claims priority, application Japan, Aug. 6, 1973, 48-87493; July 30, 1973, 48-84903; Aug. 6, 1973, 48-87494; Aug. 8, 1973, 48-88452

Int. Cl.² B01J *17/00*

U.S. Cl. 29—578 **2 Claims**



1. A method of manufacturing a semiconductor device comprising the steps of:

a. forming a first semiconductor region of a first conductivity type in a first portion of the surface of a semi-conductor substrate of a second conductivity type, opposite said first conductivity type;

b. forming a first semiconductor region of said second conductivity type in a portion of said first semiconductor region, thereby defining a first p-n junction therebetween which extends to said surface of said substrate;

c. selectively forming a first layer of insulating material on said surface of said substrate so as to cover said first p-n junction and having an opening therethrough exposing one of said first and second semiconductor regions;

d. forming a first electrode through said first opening onto said one of said semiconductor regions so as to partially overlie said first layer of insulating material and overlapping that portion of said first layer of insulating material overlying said first p-n junction;

e. converting the exposed surface portion of said first electrode to a second layer of insulating material, so that said second layer of insulating material is contiguous to the portion of said first layer of insulating material which said first electrode partially overlies;

f. forming a second hole in said first layer of insulating material so that an edge of said second hole is in registration with the edge of said second layer of insulating material and said second hole exposes the other of said first and second regions; and

g. forming a second electrode through said second hole onto said other of said semiconductor regions.

3,975,819

METHOD FOR PASSING AN INSULATED WIRE THROUGH THE INSIDE OF FERROMAGNETIC PIPE FOR A HEAT-GENERATING PIPE UTILIZING SKIN EFFECT CURRENT

Masao Ando, Yokohama, Japan, assignor to Chisso Corporation, Osaka, Japan

Filed Jan. 8, 1975, Ser. No. 539,561

Claims priority, application Japan, Jan. 9, 1974, 49-5792

Int. Cl.² H05B *3/00*

U.S. Cl. 29—611 **3 Claims**

1. In the construction of a heat-generating pipe utilizing skin effect current consisting of a ferromagnetic pipe and an elongated insulted wire unit passed therethrough with an arrangement such that when an alternating current is passed through said insulated wire unit an alternating current corresponding thereto flows concentratedly through the inner skin portion of said ferromagnetic pipe to generate heat, but practically no current appears on the outer skin thereof, the method for passing said insulated wire unit through said pipe, which comprises,

a. introducing a liquid into said ferromagnetic pipe, and

b. then passing through the inside of said ferromagnetic pipe an insulated wire unit which includes foamed material in a quantity sufficient so as to make the apparent specific gravity of the insulated wire unit almost equal to or less than the specific gravity of said liquid,

c. said liquid introduced into said pipe being of sufficient quantity to float said insulated wire unit apart from the inner surface of said pipe.

3,975,820

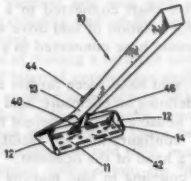
RAZORS AND BLADE CARTRIDGE THEREFORE

William Robert Lincoln Torance, 5 Lamont Ave., Agincourt, Ontario, Canada

Filed May 12, 1975, Ser. No. 576,884

Int. Cl.² B26B *21/14, 21/52*

U.S. Cl. 30—47 **1 Claim**



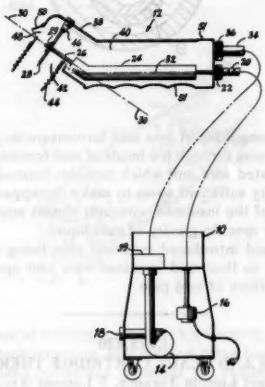
1. A razor comprising in combination; a pair of blades, each having a pair of parallel oppositely facing cutting edges therein, each blade spaced apart from the other by a spacer plate held therebetween; a handle member having a pair of spaced apart extensions thereon forming a yoke therebetween; means for fastening said pair of blades and said spacer together as a unit with their blade edges in parallel and having side edges substantially perpendicular thereto; means for swivelably holding said blade unit within said yoke; inwardly facing projections on each arm of the yoke of said handle adapted to mate with dimples formed in the sides of a cartridge member holding said blades and said spacer in a unitary body, thereby to permit rotational movement of said cartridge within said yoke; and stop means on said handle between said extensions to prevent said cartridge from rotating during use of the razor for shaving, said stop means being outwardly moveable between said yoke arms by interconnection with an ejection lever downwardly pivotable from said handle to force said projections out of said dimples in said cartridge.

3,975,821

INSTRUMENT FOR USE IN ORTHOPEDIC SURGERY

Paul L. Flicker, 286 E. Main St., Somerville, N.J. 08876

Continuation-in-part of Ser. No. 493,935, Aug. 1, 1974, abandoned. This application Dec. 4, 1975, Ser. No. 637,909
Int. Cl.[2] B26B 25/00
U.S. Cl. 30—124 11 Claims



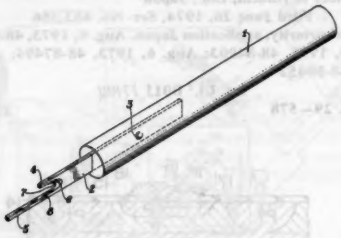
1. Apparatus for cutting casts of plaster or other similar materials in the field immobilization orthopedics comprising;
   a. a flexible drive shaft connected to a remotely located drive means for rotation of said drive shaft;
   b. a flexible vacuum hose connected to a remotely located blower;
   c. a hand-piece, said hand-piece further comprising;
      1. a housing defining an enclosure, said housing including an exterior housing surface thereof having a generally cylindrical configuration to facilitate being firmly gripped by a hand of the operator;
      2. a vacuum coupling in said housing having fluid flow communication with the interior of said enclosure, said vacuum hose being connected to said vacuum coupling;
      3. a drive coupling in said housing, said drive shaft being attached to said drive coupling and extending within said housing;
      4. a cutting means located at least partially in said housing to form a primary vacuum in the neighborhood of said cutting means;
      5. an oscillation shaft secured to said cutting means at an angle with respect to said drive shaft in said housing; and
      6. a cam and follower mechanism located within said housing and being secured to said oscillation shaft and said drive shaft to cause said oscillation shaft to oscillate upon rotation of said drive shaft, said mechanism maintaining said oscillation shaft and said drive shaft in a position at an angle with respect to one another and coplanar with respect to one another such that the axes of said oscillation shaft and said drive shaft are positioned in an intersecting orientation.

3,975,822

NEEDLEPOINT AND CREWEL-EMBROIDERY STITCH REMOVER

Richard C. Mabus, 46 Mary Drive, Towaco, N.J. 07082

Filed May 28, 1975, Ser. No. 581,582
Int. Cl.[2] B26B 29/00
U.S. Cl. 30—294 4 Claims



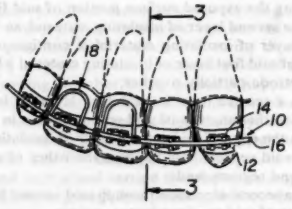
1. A needlepoint and crewel embroidery stitch remover having a handle secured at one end to a member, said member terminating at its other end, in a bifurcation including a long tine and a short tine with a crotch thereinbetween, said long tine and said short tine terminating in blunted points, said crotch containing a tapered surface terminating in a cutting edge, said tapered surface extending from a mid-point of the crotch substantially to the end of the short tine and also extending substantially the same length only to a pre-determined point on the inner surface of the long tine, said long tine having an elongated portion extending beyond said point a distance of about ⅜ inch to ¾ inch.

3,975,823

ORTHODONTIC TORQUING SYSTEM

Alan Jay Sosnay, 55 E. 9th St., New York, N.Y. 10003

Filed Jan. 21, 1975, Ser. No. 542,729
Int. Cl.[2] A61C 7/00
U.S. Cl. 32—14 A 30 Claims



1. An orthodontic torquing appliance for applying torquing forces to at least one tooth, comprising:
   an arch wire adapted to be secured to a surface of said at least one tooth; and
   at least one torquing device for applying a force to said surface of said tooth comprising a loop having a top central portion adapted to contact said surface of said tooth at a position spaced from said arch wire, and a pair of extending legs, each leg terminating in at least one force applying spring coil which is integral with its respective leg, each of said coils being unrestricted with respect to said arch wire; and means for fixedly and nonrotatably attaching the ends of said unrestricted coils, at portions thereof spaced from their respective legs, to said arch wire to be anchored against axial and rotary displacement relative to said arch wire.

3,975,824

ORTHODONTIC BRACKETS

Brian William Lee, 526 Riverdale Road, Camberwell, Victoria, Australia

Filed Mar. 28, 1975, Ser. No. 562,917

Claims priority, application Australia, Apr. 2, 1974, 7126/74

Int. Cl.² A61C 7/00

U.S. Cl. 32—14 A 17 Claims

1. An orthodontic bracket comprising first and second opposed portions, the first portion being adapted for attachment to the labial surface of a tooth and the second portion being adapted to accommodate a horizontally disposed arch wire; the first portion having at least one undercut recess for accommodating a cement, and the arrangement and construction being such that, upon cementing of the bracket to the tooth and hardening of the cement, there is a physical lock between the bracket and the hardened cement said first and second portions being separable and being connected by tappered peg-shaped protrusions which press-fit into corresponding depressions in the surface of the first portion.

3,975,825

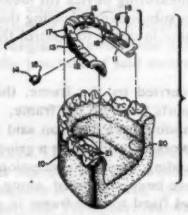
ORTHO-ACTIVATING METHOD AND APPARATUS

C. Perry Smith, 2893 Grove Lane, Ventura, Calif. 93003

Filed June 11, 1975, Ser. No. 585,776

Int. Cl.² A61C 7/00

U.S. Cl. 32—14 R 8 Claims



5. An ortho-activating apparatus comprising, in combination:

a. a basic framework receivable in a patient's mouth and conforming to the patient's arch so that the framework is generally lingual to the teeth and holds itself in a fixed position relative to the patient's jaw, said basic framework including at least one chamber having a front opening lingual to a tooth to be moved; and,

b. an inflatable membrane receivable in said chamber and having an air inlet portion passing through the rear of said chamber for receiving air under pressure so that said membrane can be inflated to a given pressure, whereby a pneumatic uniform force is applied by said membrane through said front opening over an area of the tooth to thereby provide a uniform pressure against the tooth to gradually move said tooth.

3,975,826

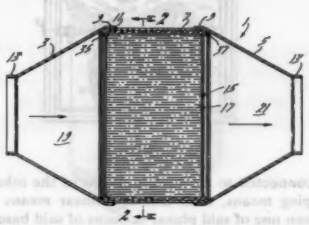
CATALYTIC CONVERTER FOR EXHAUST GASES

Robert N. Balluff, Rives Junction, Mich., assignor to Tenneco Inc., Racine, Wis.

Division of Ser. No. 207,793, Dec. 4, 1971, Pat. No. 3,798,006. This application Jan. 2, 1974, Ser. No. 430,299

Int. Cl.² B01J 8/00; F01N 3/15; B21D 53/00; B23P 15/26

U.S. Cl. 29—157 R 12 Claims



1. The method of making a catalytic converter for use in exhaust systems of internal combustion engines comprising inserting a porous monolithic refractory catalyst element into a tubular metal shell with an annular nonmetallic fibrous resilient layer extending beyond one end of the element and located in an annular space between the outer periphery of said element and said shell, bending said extending end of the layer and a portion of the shell over an outer corner of the element, and attaching inlet and outlet conduit means to the shell and located respectively at opposite ends of the element to provide for passage of gas through the element.

2. In the method of making a catalytic converter for use in exhaust systems of internal combustion engines, the steps of inserting a frangible porous monolithic refractory catalyst element into a tubular metal shell with an annular resilient nonmetallic fibrous layer extending beyond an end of the element and located in an annular space between the outer periphery of said element and said shell and bending and maintaining said extending end of the layer over an outer corner of the element.

5. In the method of making a catalytic converter for use in exhaust systems of internal combustion engines, the steps of inserting a porous monolithic refractory catalyst element into a tubular metal shell with an annular nonmetallic resilient fibrous layer located in an annular space between the outer periphery of said element and said shell, injecting a colloidal adhesive and rigidizing solution into the fibrous layer, and heating the layer to evaporate the vehicle of said solution and deposit the colloidal material adjacent the outermost faces of the layer.

3,975,827

MEASURING APPARATUS

Richard K. Roedel, 16816 Dumfries Road, Dumfries, Va. 22026

Filed Dec. 18, 1974, Ser. No. 534,055

Int. Cl.² B43L 7/00

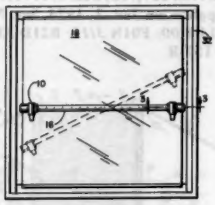
U.S. Cl. 33—80 8 Claims

1. Apparatus for use in combination with a base member having planar surfaces, said apparatus comprising:

a. linear means extending across and adjacent to a planar surface of said base member;

a pair of opposing U-shaped clamping means, each having a bight portion and two leg portions extending from the bight portion and adapted to engage the planar surfaces of said base member, one leg of each clamping means having a transverse slit located intermediate

thereof, reeling means mounted on the opposite leg of each said clamping means and engaging an end of said linear means; when said pair of clamping means are clamped on said base member said linear means extends from said reeling means on one clamping means around said bight portion, through said slit, along one of said planer surfaces, through the slit around the bight portion



and connected to the reeling means of the other of said clamping means, such that said linear means will pass between one of said planar surfaces of said base member and the portion of each leg extending past said slit;

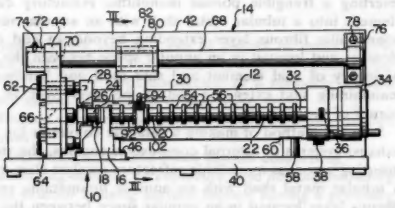
c. said U-shaped clamping means being selectively, uniformly and relatively movable over said planar surfaces along the edges of said base member.

3,975,828

ADJUSTABLE MASTER SETTING GAUGE

Bernard Jacob Calcaterra, Joliet; Harold Edward Ogg, Jr., Dwight, and James Herschell Osborne, Peotone, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Jan. 8, 1975, Ser. No. 539,372
Int. Cl.² G01B 3/18, 5/00
U.S. Cl. 33—165 **6 Claims**



1. An adjustable master setting gauge, comprising:

a height gauge fixture comprising a bar;

a base;

means for slidably supporting one end of said bar within said base;

a micrometer head telescopically attached to the other end of said bar, said bar having a plurality of parallel ridges annularly upraised therefrom, said ridges having flat faces thereon which are perpendicular to the axis of said bar and are at precisely spaced intervals from one another;

means adapted to telescopically move said bar a distance generally equal to at least one of said precisely spaced intervals;

a linearly extending frame including a generally flat portion extending generally the length of said gauge;

means mounting said gauge to said frame with said bar generally parallel to said flat portion;

a bracket mounted to and extending from said frame intermediate the ends thereof and including a first gauging surface parallel to said faces and alignable to be coplanar with a respective one of said faces via telescopic movement of said bar through adjustment of said micrometer head, said first gauging surface being laterally spaced from said bar;

a rod mounted parallel to said bar and said frame and spaced therefrom;

means for mounting said rod to said frame;

a gauge mounting member detachably attachable to said bar having an arm extending laterally from said bar, said arm including a second gauging surface aligned to be parallel to said faces and spaced at a precise distance longitudinally therefrom and alignable to be coplanar with any one of said faces, said first and second gauging surfaces being laterally spaced generally an equal distance from said bar;

a guide block; and

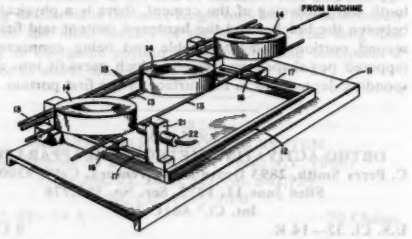
means for slidably and pivotally mounting said guide block to said rod, said gauge mounting member being attached to said block.

3,975,829

MEASURING DEVICE FOR MECHANICAL WORKPIECES

Mario Possati, Bologna, Italy, assignor to Finike Italiana Marposs-Soc. In Accomandita Semplice di Mario Possati & C., Bentivoglio, Italy

Continuation of Ser. No. 500,008, Aug. 23, 1974, abandoned, which is a continuation of Ser. No. 273,817, July 21, 1972, abandoned. This application Apr. 4, 1975, Ser. No. 565,194
Claims priority, application Italy, July 30, 1971, 3488/71
Int. Cl.² G01B 5/16
U.S. Cl. 33—169 R **2 Claims**



1. A dimension measuring device for measuring the dimensions of workpieces subsequently leaving the exit of a centerless grinding machine in order to control the machine, comprising:

a frame;

support means carried by the frame, the support means including supports fixed on the frame;

collecting and guiding bars fixed on said supports adapted for receiving workpieces leaving a grinding machine and for directly guiding them in succession, in the order in which they have been machined, along the bars; and

a measuring head fixed to said frame in a side position of said bars, the measuring head including:

a casing;

a shaft axially movable in said casing towards and away from the workpieces passing along the bars;

a finger fixed at an end of said shaft, for contacting the workpieces to be measured;

resilient means arranged in said casing and coupled to said shaft for thrusting said finger against the workpieces passing past the measuring head;

an hydraulic damper for making said finger follow the profile of each workpiece passing past the measuring head, said hydraulic damper comprising a piston coupled to and coaxial with said shaft, a cylinder coupled to said casing, and a fluid contained in said cylinder for dampening the movement of the piston in the cylinder; and

a position transducer including a first member fixed to said shaft, a support member fixed to said casing, a second member fixed to said support member, socket and cable means fixed to said support means and connected to said second member adapted to provide a dimension measurement signal depending on the shaft position;

whereby all of the workpieces leaving the grinding machine are measured while passing in succession, guided by said bars past the measuring head.

3,975,830

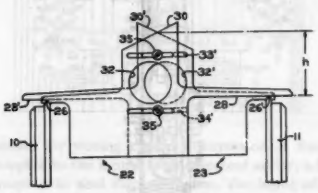
CENTERING TOOL

Edwin Francis Lopacki, Tuscaloosa, Ala., assignor to The B. F. Goodrich Company, Akron, Ohio

Filed Aug. 13, 1975, Ser. No. 604,329

Int. Cl.² G01B *3/00*

U.S. Cl. 33—191 **12 Claims**



1. A centering tool for locating the center between a pair of spaced rim falnges of a tire building machine comprising a pair of members, each member having at least one flat surface with portions of said surfaces being in sliding and abutting contact with each other, each of said members having one reference point and a linear reference edge in alignment with said reference point, means interconnecting said members to permit limited linear sliding movement therebetween on said flat surfaces in a direction parallel to said linear reference edge and to locate one of said reference points on one of said rim flanges and the other one of said reference points on the other of said rim flanges, said interconnecting means maintains said reference points and said reference edges on a linear reference line that is parallel to the axis of and intersects the outer edge of said spaced rim flanges, each of said members having a second reference edge that upon a projected extension intersects the extension of said linear reference line and makes an acute included angle therewith, and said interconnecting means maintains the juncture of said second reference edges at a point contact.

3,975,831

DIRECTING INSTRUMENT

Goran Jysky; Ilmar Mardla, and Bjorn Ericsson, all of Nykoping, Sweden, assignors to Ilmeg AB, Nykoping, Sweden

Filed July 31, 1974, Ser. No. 493,374

Claims priority, application Sweden, Aug. 2, 1973, 7310672; Oct. 31, 1973, 7314833

Int. Cl.² B23B *49/00*; G01C *9/14, 9/16*

U.S. Cl. 33—333 **10 Claims**

1. The arrangement which comprises in combination

a. a mobile carrier in the nature of a tractor, or the like,

b. a drill post or pile driving mechanism mounted on one portion of said mobile carrier,

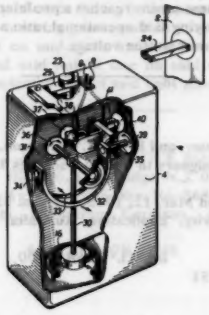
c. sensing means for sensing the inclination of the post or pile driving mechanism in two directions that are perpendicular to each other, said sensing means including at least one pendulum system,

d. a holder for said sensing means,

e. said holder being attached to said drill post or pile driving mechanism by a connecting member, said connecting member being rotatable about a general horizontal axis,

f. said holder being attached to said connecting member so that it can be rotated about an axis that is parallel to the axis of the drill post or pile driving mechanism,

g. means remote from said post or pile driving mechanism for rotating said holder about an axis that is generally vertical,



h. means for transmitting the inclination sensed by said sensing means to an indicating position on the mobile carrier that is remote from said post or pile driving mechanism.

3,975,832

HOT AIR DRYING MACHINE

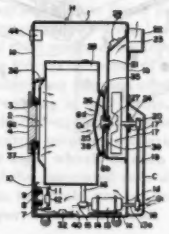
Kunihito Mori, Toyonaka; Akira Kobayashi, Kobe; Yoshinobu Kishimoto, Amagasaki; Yukinobu Ohmichi, Takatsuki, and Masatatsu Nakamura, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Dec. 20, 1974, Ser. No. 535,027

Claims priority, application Japan, Dec. 26, 1973, 48-2748

Int. Cl.² F26B *11/04*

U.S. Cl. 34—53 **12 Claims**



1. A hot air drying machine for drying clothes or the like, said machine comprising:

a drum rotatably provided in a housing and having an opening for receiving materials to be dried through a corresponding opening formed in said housing;

a fan casing enclosing a rotatable fan therein and mounted in said housing, said fan casing communicating with said drum for air circulation therethrough and having an exhaust opening for discharging hot air out of said housing formed at an upper portion of said fan casing;

means for simultaneously rotating said drum and said fan;

heating means for heating outside air sucked into said housing through a suction opening formed in said housing;

a first temperature sensing resistance element means for providing a first resistance value which varies according to the temperature of hot exhaust air through said drum and said fan casing;

a second temperature sensing resistance element means for providing a second resistance value which varies according to the temperature of outside air sucked into said housing;

means for completing a drying operation when an operational ratio of said first temperature sensing resistance element means to said second temperature sensing resistance element means reaches a predetermined level; and

means for varying said operational ratio according to variations of power source voltage.

3,975,833

DRIER

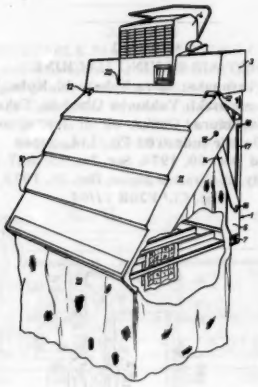
Charles Rothauser, and Bruce R. Thompson, both of Norwood, Australia, assignors to United Packages Limited, Brisbane, Australia

Filed Mar. 12, 1975, Ser. No. 557,576

Claims priority, application Australia, Mar. 18, 1974, 6937/74

Int. Cl.² F26B *13/00*

U.S. Cl. 34—151 4 Claims



1. A clothes airer or dryer comprising a main frame adapted to be mounted on a wall or similar support, a hollow upper section on the main frame and open downwardly when operatively positioned, said upper section on its upper portion having an aperture to detachably and operably engage and support a room heater fan unit, a hood pivotally secured at one end to said frame at the upper end thereof, and a grid pivoted to the lower end of the frame so that the grid can be folded up against the main frame, and the hood swung downwardly to cover the grid to provide a compact grid enclosed storage position, flexible means connecting the outer end of the grid to the upper portion of the frame to support the grid in a horizontal position, latch means to hold the hood in a raised position to allow clothes to be positioned on the grid, with the grid supporting the other end of the hood when the hood is lowered onto the outer end of the grid, the hood sloping downwardly from the frame to the outer end of the grid to form an air distribution chamber over the grid in the drying position.

3,975,834

SIMULATED FLAME TORCH

Robert M. Eisenberg, Woodbine, Md., and Walter E. Myles, Alexandria, Va., assignors to The Singer Company, New York, N.Y.

Filed Aug. 4, 1975, Ser. No. 601,421

Int. Cl.² G09B *9/00*

U.S. Cl. 35—1 10 Claims

1. A simulated flame torch which comprises:

a. a portable housing containing hollow space; a handle at one end of said housing;

b. means for producing light contained within the hollow space of said member;

c. a source of electric power coupled to said light producing means;

d. heat sensing means for turning said light producing means on;

e. a plurality of flexible light pipes attached to said housing at its opposite end for transmitting light from said light producing means to the outside of said member whereby a simulated flame is produced when said member is moved through the air; and

f. a container for said housing and means for turning said light producing means off when said housing is placed in said container.

3,975,835

COMPUTER APPLICATIONS TRAINER

Ronald Reichman, College Park, Md., assignor to The Singer Company, New York, N.Y.

Filed Feb. 19, 1975, Ser. No. 551,168

Int. Cl.² G09B *25/02*

U.S. Cl. 35—13 7 Claims

1. A classroom training and display system under the control of an instructor for displaying digital information and for simulating some digital computer operations; said system comprising:

a. a plurality of first registers for storing digital information;

b. manually controlled means coupled to said plurality of first registers for an instructor to write one or more bits of digital information into each of said first registers;

c. a first adder coupled to said first registers;

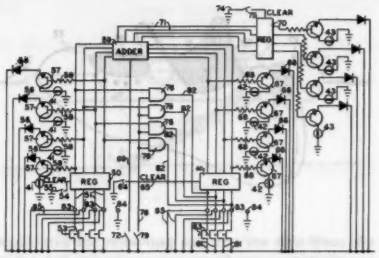
d. timing means coupled to said first adder and said first registers for the instructor to control the time in which said adder adds and thus determines the value of the bits stored in said first registers;

e. a second register coupled to said first adder for storing the digital information contained in said first adder;

f. means coupled to said first registers and said second register for simultaneously displaying each bit of digital information stored in said first registers and said second register to a group of students at the same time;

g. means coupled to said system for connecting said system to a source of electric power to demonstrate to a group of students various computer operations; and

means for multiplying digital information wherein said multiplying means comprises a second adder for adding digital information; a third register coupled to said means to write, said display means, and the input of said second



adder, for storing digital information; a fourth register coupled to the inputs of said second adder; a fifth register coupled to said display means, the input of said fourth register and the output of said second adder for storing the digital information contained in said third register and said fourth register; and switching means coupled to said fourth register and said fifth register for transferring the contents of said fourth register so that the amount of times said switching means are used will represent the number of times the digital information contained in said third register was multiplied enabling a student to see the numerical steps via said display system.

3,975,836

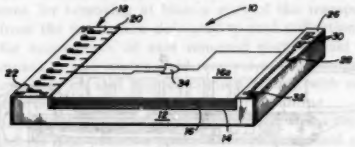
LOGIC LEARNING APPARATUS

Leonard J. Broder, 3192 Darvany Drive, Dallas, Tex. 75220

Filed Mar. 31, 1975, Ser. No. 563,499

Int. Cl.² G09B *23/02*

U.S. Cl. 35—30 **7 Claims**



1. A logic teaching game comprising:

a housing having a plurality of two position switches mounted thereon and operable to generate combinations of logic ones and logic zeros,

a plurality of discrete electronic logic circuits connected in parallel to one another,

each of said switches connected to the input of at least one of said plurality of discrete electronic logic circuits to supply said combinations of logic ones and logic zeros,

each of said logic circuits being unique relative to the other logic circuits and generating a predetermined output signal only upon proper operation of said switches connected to the input thereof,

a plurality of light generating devices each connected to receive said predetermined output signal from one of said logic circuits in order to be illuminated to indicate a successful operation of said switches associated with said logic circuits,

a plurality of cards each bearing a visual diagram representation of a different one of said logic circuits and each having a single output line, wherein said output line points to a single position adjacent a selected one of said light generating devices when said card is positioned on said housing, and

means in said housing for receiving, aligning and storing said plurality of cards during both operation and non-use of the logic teaching game, such that input terminal representations on said cards are positioned adjacent said switches and said output line on said cards is located adjacent a selected one of said light generating devices.

3,975,837

WALL-MOUNTED NOTICE BOARD

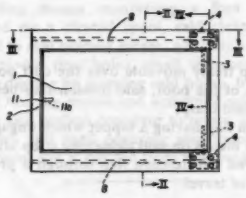
Dieter Baars, 25 High St., Glen Ridge, N.J. 07028

Filed Apr. 16, 1975, Ser. No. 568,567

Claims priority, application Germany, Apr. 22, 1974, 2419245

Int. Cl.² A47B *97/06*

U.S. Cl. 35—63 **8 Claims**



1. A wall-mounted notice board comprising a frame having four peripheral portions and a rear wall joining the same adapted for alignment with a wall on which the device is mounted, a front wall loosely fitting within said frame, pivot means adjacent one side edge of said front wall and protruding beyond upper and lower edges of said front wall into guide means in opposed top and bottom frame parts, and said guide means extending longitudinally along said opposed frame parts permitting said pivot means of the front wall to be moved selectively from one side to the other of said frame, each of said guide means comprising opposed coplanar rails having a close front to rear spacing in said frame, said pivot means comprising eight wheeled carriages extending between said rails and having central pivot pins coaxially engaging said front wall, and said eight wheels of each carriage engaging opposed surfaces of the associated rails at opposed sides of said central pivot pin, to thereby provide load bearing stability in the movable support of said front wall.

3,975,838

SKI BOOT

Hans Martin, Chasernweg 7, Kloten, Switzerland

Filed June 9, 1975, Ser. No. 584,825

Claims priority, application Switzerland, June 20, 1974, 8472/74; Nov. 20, 1974, 15462/74

Int. Cl.² A43B *11/00*; A43C *11/00*

U.S. Cl. 36—121 **13 Claims**

1. A ski boot having an upper part and a fastening mechanism for tightening the upper part about a foot, the fastening mechanism comprising

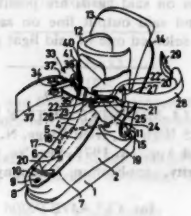
a tension member extending across an opening in the instep portion of the upper part;

a clasp in the cuff portion of the ski boot, one end of said tension member being tightly connected to said clasp, said clasp being openable on the instep side of the boot;

first and second tightening straps on opposite sides of the cuff portion,

guide means for said tension member, one end of said guide means being attached to one of said first and second straps,

shoulder means fixedly attached to said one of said first and second straps; and



a tension flap freely movable over the cuff portion on the instep side of the boot, said tension flap being connectable with said clasp,

said tension flap having a tappet which engages with said shoulder means on said tightening strap after said clasp has moved said tension flap through a predetermined amount of travel.

3,975,839

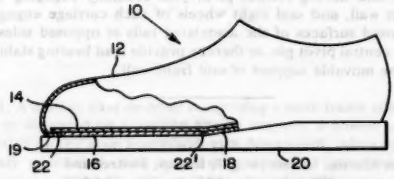
FOOTWEAR

George J. Taber, Buffalo, N.Y., assignor to Tractioneers, Inc., Buffalo, N.Y.

Filed Mar. 12, 1975, Ser. No. 557,796

Int. Cl.[2] A43B *13/38*

U.S. Cl. 36—86 10 Claims



1. An article of footwear comprising

an upper,

an outsole secured to said upper,

a first wooden filler having its grain extending crosswise of the footwear and being disposed in the toe and ball areas of the footwear, and

a second filler, whose grain extends longitudinally of the footwear,

said second filler being disposed in the instep and heel areas of the footwear.

3,975,840

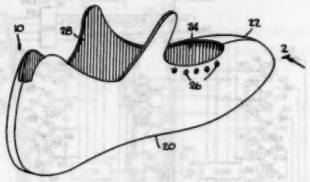
MOLDED ATHLETIC BOOT AND METHOD OF MAKING SAME

Maurice J. Juzenko, LaSalle, Canada, assignor to Garcia Corporation, Teaneck, N.J.

Filed Jan. 24, 1975, Ser. No. 543,954

Int. Cl.[2] A43B *5/04*; A43D *9/00*

U.S. Cl. 36—117 25 Claims



1. An athletic boot comprising a molded outer shell shaped to encase a human foot, and a porous, cloth-like insert impregnated and encapsulated by the material of said outer shell and interlocked therewith, said insert having a higher elastic modulus than said outer shell.

3,975,841

SHIP AND PIER FOR EXTRACTION OF VALUABLE MATERIALS FROM THE SEA BED

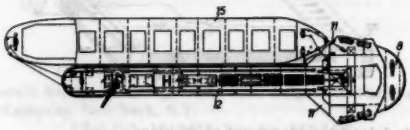
Heinz W. L. Steenken, Reinbek, and Detlef G. H. Luth, Hamburg, both of Germany, assignors to Howaldtswerke-Deutsche Werft Aktiengesellschaft Hamburg und Kiel, Hamburg, Germany

Filed Apr. 15, 1975, Ser. No. 568,317

Claims priority, application Germany, Apr. 20, 1974, 2419056

Int. Cl.[2] E02F *7/02*

U.S. Cl. 37—54 4 Claims



1. Apparatus for extracting valuable materials from the sea bed, comprising a body capable of floating on the sea and carrying equipment by which the material can be extracted from the sea bed during propulsion of the body thereover, a pier adjoining and unitarily connected to the body and arranged to permit the mooring thereto of transport ships to receive the material, and conveyor devices associated with the pier and arranged to convey the material from the body directly into a ship moored to the pier and body, said body being in the shape of a ship's hull, the pier being adjoined and connected to the hull, and the pier being disposed symmetrically to the axis of the body, the body and pier as viewed in plan having the general form of an arrow with the body forming the head of the arrow and the pier forming the shaft of the arrow.

3,975,842
METHOD AND APPARATUS FOR DREDGING EMPLOYING A TRANSPORT FLUID FLOWING IN SUBSTANTIALLY CLOSED RECIRCULATING COURSE

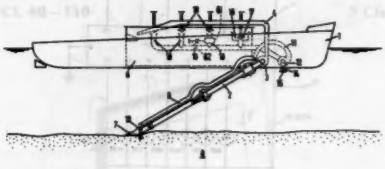
Johannes Franciscus Reinardus Andreae, Gorinchem, Netherlands, assignor to Bos Kalis Westminster Group N.V., Sliedrecht, Netherlands

Filed Oct. 15, 1974, Ser. No. 514,506

Claims priority, application Netherlands, Oct. 15, 1973, 7314168

Int. Cl.² E02F 3/88

U.S. Cl. 37—58 **4 Claims**



3. Apparatus for removing soil and the like from the sea bottom for delivery of same to a collection operation on the sea surface comrpising

a collection hopper

a suction pump having suction and discharge sides

a first conduit connected at one end to the suction side of said suction pump and having a suction head enclosure at its other end, said suction head enclosure being adapted for positioning of the same on the sea bottom,

a delivery line extending from the discharge side of said suction pump to said collection hopper,

a source of transport fluid,

a pressure pump having suction and discharge sides there being conduit means connecting the suction side of said pump with said source,

a second conduit connected at one end with the discharge side of said pressure pump, the other end of said second conduit extending to and being connected with said suction head enclosure in communication with the interior of said suction head enclosure, operation of said suction pump and said pressure pump being effective to cause a soil suspension in said transport fluid to be conveyed to said collection hopper, and

means for removing at least a part of the transport fluid from the suspension delivered to said collection hopper for conveyance of said removed part to said conduit means as said source, said removal means comprising an overflow on said hopper communicating with said conduit means, said apparatus further including

separating means intervening said overflow and the suction side of said pressure pump for separating said removed part of the transport fluid into two streams with respectively a higher and a lower soil particle concentration, there being means associated therewith for selectively conveying the lower soil particle concentration stream to discharge in the sea.

3,975,843
PORTABLE POWER DIGGING TOOL

Wallace D. Ellison, 3116 Glendon Ave., W. Los Angeles, Calif. 90034

Filed July 15, 1974, Ser. No. 488,400

Int. Cl.² E02F 3/08

U.S. Cl. 37—86 **4 Claims**

1. A portable power digging tool for use in excavating post holes, small trenches, and general digging, by a single operator, said portable power digging tool comprising;

a. an upright frame about which an endless conveyor is carried;

b. a plurality of buckets propelled by said endless conveyor for cutting and carrying soil;

c. emptying means for causing soil carried by said buckets to be ejected therefrom;

d. bracing means pivotly mounted to said frame for carrying loads resulting from excavation and for transmitting said loads back into the ground;

e. motor means for driving said endless conveyor;

f. propelling means comprising a foot pad rotatably mounted on a cleated spool, said cleated spool being secured to said bracing means; whereby a single operator can excavate post holes, small trenches, and perform general digging by grasping said frame, by placing a foot on said bracing means and activating said motor means causing said endless conveyor to rotate, said buckets cut and carry soil until engaging said emptying means at which point soil is ejected from said buckets.

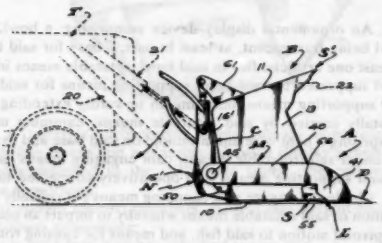
3,975,844
DIGGER TOOTH MEANS FOR FRONT LOADER BUCKETS

Rueben C. Olson, 6211 Mahogany Ave., Westminster, Calif. 92683

Filed Nov. 10, 1975, Ser. No. 630,701

Int. Cl.² E02F 3/76

U.S. Cl. 37—117.5 **6 Claims**



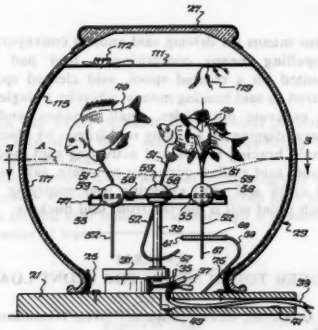
1. In combination, a normally forwardly opening excavating bucket with normally substantially horizontally disposed vertically spaced top and bottom walls, a vertically extending rear wall and vertical side walls, said bottom wall having a forwardly projecting forwardly disposed transverse earth-engaging lip, elevator and tipping means connected with the rear wall to raise and lower the bucket and to tip the bucket about a transverse axis, a digger tooth attachment comprising a transversely extending elongate bar normally in working position adjacent said lip and having a plurality of elongate laterally spaced digger teeth fixed thereto and projecting forwardly therefrom, elongate normally horizontally disposed elevator arms at the opposite sides of the bucket with forward ends fixed to related ends of said bar and rear ends fixed to the ends of an elongate transversely extending pivot shaft spaced rearward of the rear wall of the bucket, laterally spaced bearing

means rotatably and shiftably support the shaft relative to the rear wall of the bucket, a lever arm on and projecting radially from the longitudinal axis of the shaft, a cylinder and ram drive unit fixed to and extending between the bucket and the lever arm selectively rotating and shifting the shaft to pivot the elevator arms and the bar between said normal working position and a non-working position where said bar is positioned adjacent the top wall of the bucket.

3,975,845
ORNAMENTAL DISPLAY

George K. Mellard, 17360 - 232nd St., SW. Lot 34, Goulds, Fla. 33170

Filed Mar. 21, 1975, Ser. No. 560,622
Int. Cl.² A63H *13/20*
U.S. Cl. 40—106.3 **6 Claims**



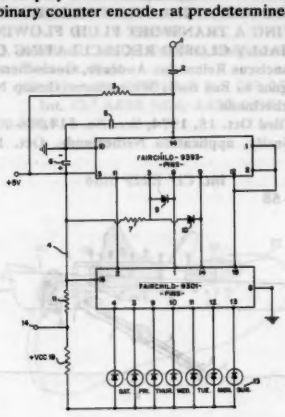
1. An ornamental display device comprising: a bowl, said bowl being transparent, at least in part; a base for said bowl; at least one artificial fish in said bowl; rotatable means in said bowl supported by said base; supporting means for said fish, said supporting means including an upwardly extending wire pivotally carried by said rotatable means; camming means comprising a bent wire and mounted on said base and extending under said rotatable means; cam engaging means carried by said supporting means, and operatively connected to said fish, adapted to engage said camming means periodically upon rotation of said rotatable means whereby to impart an oscillating pivotal motion to said fish; and means for causing rotation of said rotatable means.

3,975,846
ELECTRONIC CALENDAR SYSTEM

Leon S. Wecker, 700 NE. 14th Ave., Hallandale, Fla. 33009

Filed Jan. 27, 1975, Ser. No. 544,111
Int. Cl.² G09D *3/00;* **G04B** *19/24*
U.S. Cl. 40—107 **3 Claims**

1. An electronic calendar for use as an attachment to a conventional electronic clock producing an AM pulse every 24 hours; the electronic calendar including a binary counter encoder adapted to be driven by an AM pulse of a conventional electronic clock to produce an output of binary encoded digits, a decoder driver connected to the output of the binary counter encoder to be activated thereby, a visual display means connected to the decoder driver to be driven thereby to display calendar indicia, and reset means for resetting the binary counter encoder at predetermined pulse inter-

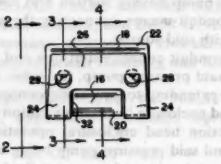


vals, and wherein said binary counter encoder and decoder driver are each integrated circuits combined in a single unit.

3,975,847
ONE-PIECE CLIP

Robert J. Slavsky, Southfield, Mich., assignor to Shaw & Slavsky, Inc., Detroit, Mich.

Filed Nov. 24, 1975, Ser. No. 634,780
Int. Cl.² G09F *3/18*
U.S. Cl. 40—11 R **1 Claim**



1. In a one-piece card clip, for use with a shelf molding, formed of springy, somewhat stiff, sheet metal having:
a first mounting portion, and a second card receiving portion; with
the first mounting portion comprising a wide, central vertical part, and two rearwardly extending diverging parts having narrow free edge lips; with the lower one of said two rearwardly extending parts being narrower than the central vertical part; the improvement comprising
the second card receiving portion including said central vertical part, a lower front part comprising two laterally spaced U-shaped loop parts behind and between which is the central vertical part, an upper front part overlapping a major portion of said central vertical part, and comprising a member joining said U-shaped loop parts and forming therewith a total front part of inverted U-shape, said upper front part having rearwardly extending lances projected through holes of said central vertical part but in vertical alignment with the U-shaped loop parts;
the upper edge of the upper front part being free and well above the upper edge of the central vertical part and well above the upper rearwardly extending diverging part whereby said upper edge may be easily grasped so as to disengage said front part from said central vertical part;
and the lower edge of the upper front part being substantially above the lower rearwardly extending diverging part thereby forming said inverted U-shaped front part so that

said lower diverging part is exposed to and is accessible from the front through the space between the two U-shaped loop parts.

3,975,848

CALENDAR

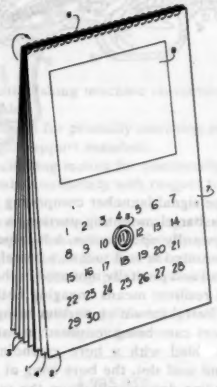
Hans R. Schmid, Kiessstrasse 23, Stuttgart-Sonnenberg, Germany

Continuation of Ser. No. 335,746, Feb. 26, 1973, abandoned. This application May 17, 1974, Ser. No. 470,993

Claims priority, application Germany, Mar. 8, 1972, 2211066

Int. Cl.² G09D *3/00*

U.S. Cl. 40—110 **3 Claims**



1. A calendar comprising a plurality of coextensive sheet members, one of said members being a thin ferromagnetic plate of about 0.1 mm thickness, another of said members comprising a stiff non-metallic support and the remainder of said members being a plurality of pages having calendar indicia on only one side thereof, all of said sheet members being rotatably bound together in an integral assembly along one edge thereof by a ring fastener, said sheet members being arranged so that said plate lies between said support and said pages, said pages being arranged so that the calendar indicia lie in chronological sequence from said plate to said support, with the page having the earliest indicia contiguous to said plate, said pages being removable from said ring fastener and rotatable thereabout to present successive pages in chronological sequence contiguous to said plate, and a magnetic indicator movably lying against the earliest page in attraction with the ferromagnetic plate, to highlight a given date thereon.

3,975,849

REFLECTING TRIANGULAR WARNING DEVICES

Anthony Z. Tuleja, 812 Hudson Drive, Sarasota, Fla. 33577

Filed Sept. 17, 1973, Ser. No. 397,757

Int. Cl.² G09F *7/06*

U.S. Cl. 40—125 N **2 Claims**

1. A reflecting warning device comprising triangular structure including a left leg, a right leg, and a bottom leg means joined together, a hole through said left leg and said right leg means adjacent the lower end thereof, an insertable warning sign means, a pair of stub connectors on the back of said warning sign means, said stub connectors on said warning sign means being insertable into said left and right leg holes whereby said warning sign means is removably affixed to said triangular structure, said warning sign means including thereon letters to make the warning sign intelligible, said triangular structure and said insertable sign means being made of plastic material, and light ray reflecting prisms on the reverse side of said legs and on the reverse side of said warning sign letters, said bottom leg means includes a pair of holes on the bottom rim thereof, one adjacent each end thereof, and a pair of supporting legs, each of said supporting legs having

adjacent one end thereof a first stub pin perpendicular to said leg and a second stub pin as a longitudinal extension of said leg, said supporting leg stub pins being insertable in said bottom leg rim holes whereby said supporting legs are in a plane substantially perpendicular to said triangular structure.

3,975,850

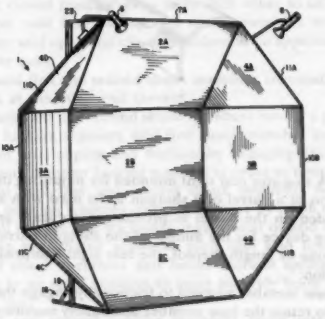
PORTABLE DISPLAY DEVICE

Antoine S. B. Giaume, 35 Sagamore Road, Bronxville, N.Y. 10708

Filed Apr. 10, 1975, Ser. No. 566,717

Int. Cl.² G09F *7/18*

U.S. Cl. 40—125 H **10 Claims**



1. A portable, light-weight display device comprising a collapsible frame and a plurality of visual display panels detachably fastened to the collapsible frame, the collapsible frame comprising:

a. two upright support members, each of said upright support members comprising:
   i. a braced foot-member attached to one end,
   ii. a plurality of first structural fasteners spaced apart along its length, and
   iii. at least one joint at which said support member may be broken;
b. three rigid rectangular frames at least one of which is rigidly and detachably connected to said two upright support members by means of said first structural fasteners, each of said rectangular frames comprising:
   i. fastening-means in its corners for fastening thereto at least one visual display panel,
   ii. at least two second structural fasteners spaced apart on its perimeter, and
   iii. at least one side whose length substantially equals the length of a side of another of the rectangular frames and which is detachably connected to said corresponding side of said other rectangular frame by means of said second structural fasteners; and

c. four rigid triangular support members, each of said triangular support members comprising:

i. at least two third structural fasteners spaced apart on its perimeter,

ii. one side whose length substantially equals the length of a side of one of the rectangular frames and which is detachable connected to said corresponding side of said rectangular frame by means of said third structural fasteners, and

iii. a second side detachably connected to an upright support member by means of said first structural fasteners.

3,975,851

SLUG-STER SIGHT FOR A SHOTGUN

Jarrette Erwin Benford, P.O. Box 4707, Macon, Ga. 31208

Filed Nov. 4, 1974, Ser. No. 520,493
Int. Cl.² F41G 1/28, 1/06
U.S. Cl. 42—1 S 9 Claims

1. A slug-ster rear sight intended for mounting on a rear end portion of a barrel of a shotgun to be used with a front sight provided on the barrel to provide an accurate and effective aiming device for the aiming of the shotgun barrel regardless of choke or length thereof, the rear sight comprising, in combination:

a base member adapted to frictionally engage the gun barrel to retain the base member detachably mounted thereon;

a sight member mounted on said base member and projecting upwardly therefrom;

sighting means disposed in said sight member and intended for use with said gun barrel front sight in the aligning and aiming of said shotgun;

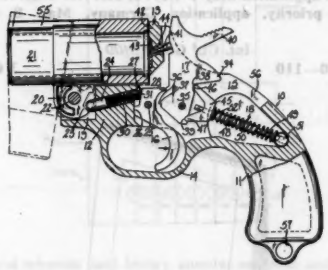
said base member, and said sighting means being formed integrally of a single flat sheet of material of a general T-shape, said T-shape including a body member of an elongated flat rectangular configuration having a pair of laterally extending wing members formed integrally at one end thereof and projecting laterally outwardly away from the side edges of the body member, said wing members being bent into a semi-circular configuration tangential with the longitudinal axis of the body member to define gripper legs of a diameter adapted to resiliently engage said gun barrel therethrough, said sighting means being formed integrally at the opposite end of said body member and being bent in an upward direction to form a ninety degree angle with said body member to project radially outwardly of said gun barrel when said body member is affixed thereto, and wherein said sighting means is defined by a V-shaped notch formed integrally with a top edge of said sight member and is adapted to be longitudinally aligned with said gun barrel front sight to accomplish the aiming of the gun barrel.

3,975,852

SIGNAL LAUNCHER

David Findlay, Guilford, Conn., assignor to Bellmore-Johnson Tool Co., Hamden, Conn.

Filed Feb. 20, 1975, Ser. No. 551,332
Int. Cl.² F41C 3/02
U.S. Cl. 42—40 4 Claims



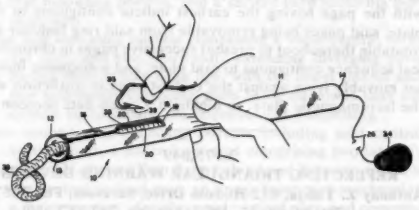
1. A pistol-type signal launcher comprising a frame having a grip portion, a barrel mounting portion, a breech portion and a central upwardly open recess, a hammer and a trigger each pivotally mounted in said recess, a barrel, a support cam fixed on the barrel and pivotally mounted in the barrel mounting portion, and resilient means engaging both said cam and said trigger, the barrel mounting portion being provided with a slot, the support cam being mounted in said slot, and the frame being provided with a bore extending between the central recess and said slot, the bore lying at an angle to the horizontal extending downwardly from the recess to the slot and the resilient means being disposed in said bore.

3,975,853

WORM HOLDER

James Calvin Aaron, 1172 Church St., Covington, Ga. 30209

Filed May 12, 1975, Ser. No. 576,624
Int. Cl.² A01K 97/00
U.S. Cl. 43—4 5 Claims



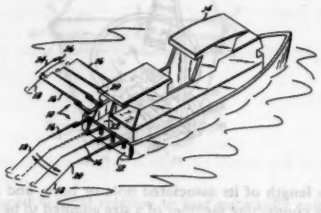
1. A bait holder for use in impaling a worm or the like with a fish hook comprising an open ended transparent tubular member defining a side opening intermediate its ends, a slot formed in said tubular member extending longitudinally from one open end of said tubular member to said side opening, a plurality of slits formed in said tubular member adjacent the end of the tubular member opposite from the slotted end, and a tethered clamp member threaded through said tubular member for clamping a worm and pulling the worm partially through said tubular member to position the worm in the vicinity of the side opening where the worm is exposed for impalement by a fish hook.

3,975,854

AUTOMATIC FISHING MACHINE

Robert R. Graham, 2228 Central Ave., Spring Valley, Calif. 92077

Filed Apr. 28, 1975, Ser. No. 572,120
Int. Cl.² A01K 79/00
U.S. Cl. 43—6.5 11 Claims



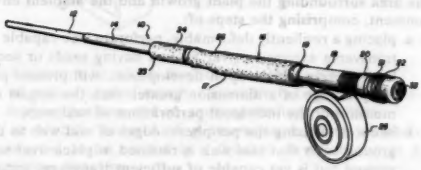
1. An automatic fishing machine comprising:
a fishing member;
a mounting means for pivotally attaching said fishing member to a rigid support member;
horizontal oscillating means for continually oscillating said fishing member uniformly with respect to said supporting member;
vertical elevating means for elevating the horizontal oscillating fishing member from a fishing position responsive to the weight of a fish attached thereto and returning said member to said fishing position when the weight is removed; and
control means for selectively elevating said fishing member in the absence of weight thereon.

3,975,855

TELESCOPIC SPIN/FLY COMBINATION FISHING ROD

James Edward McKeown, Naperville, Ill., assignor to Trimarc Corporation, Hillside, Ill.

Filed May 30, 1975, Ser. No. 582,158
Int. Cl.² A01K 87/00
U.S. Cl. 43—23 8 Claims



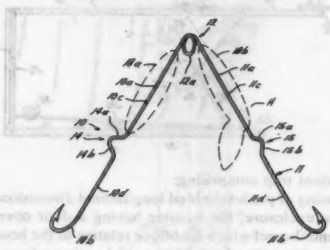
1. A combination fishing rod comprising; a plurality of hollow, tubular rod elements telescopically arranged for movement inwardly and outwardly relative to one another, the outermost rod element forming a handle-receiving section with the remaining tubular rod elements being insertable into said handle-receiving section, a removable handle positionable on said handle-receiving section, said removable handle having a hand gripping portion formed at one end thereof and a reel seat portion formed at the other end thereof, said removable handle being placed on said handle-receiving section in a first orientation to form a spinning rod and adapted to be removed and replaced on said handle-receiving section in a second orientation to form a fly-casting rod, said handle-receiving section including a first sleeve formed intermediate the ends thereof, a second sleeve on said removable handle and cooperable with said first sleeve for frictional sliding engagement therewith and for releasably securing said removable handle to said handle-receiving section, a resilient member at an end of said handle-receiving section, said resilient member having a diameter slightly larger than the diameter of said handle-receiving section and engageable with said second sleeve means to form a friction fit therewith.

3,975,856

RELEASABLE FISHING HOOK

Robert H. Gadbois, 6202 Darnell, Houston, Tex. 77036

Filed Mar. 26, 1975, Ser. No. 562,025
Int. Cl.² A01K 83/02
U.S. Cl. 43—36 2 Claims

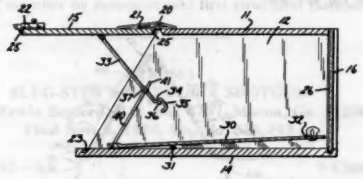


1. A new and improved releasable fishing hook, comprising:
first and second shank members yieldably connected together at one end by a yieldable connection means continuously urging said first and second shank members from a closed position away from each other to an open position, said first and second shank members moving between said open and closed positions in an approximate plane or path;
each of said first and second shank members terminating in a hook at the other end thereof;
each of said first and second shank members having a geniculated locking segment, said first shank member locking segment overlapping and frictionally engaging said second shank member locking segment in order to temporarily hold said first and second shank members in said closed position whereby external contact by a fish or the like will release said frictional engagement of said shank member geniculated segments such that said first and second shank members and hooks thereon spring outwardly to an open position to more securely hook a fish or the like;
said first and second locking segments being integrally formed with said first and second shank members and extended outwardly in opposite directions substantially perpendicular to said approximate plane of movement of said shank members between said closed and open positions;
said first and second shank member locking segments each having upper and lower bent portions which are approximately perpendicular to each other, said upper bent portions of each of said first and second shank member locking segments being disposed at an acute angle with respect to said shank member formed therewith;
said first shank member upper bent portion being positioned for frictional engagement with said second shank member upper bent portion in order to temporarily hold said first and said second shank members in said closed position until released by agitation from a fish; and
said first shank member having a first lure portion mounted thereon and said second shank member having a second lure portion mounted thereon, said first and second lure portions having mating surfaces positioned adjacent to each other with said shank members in said closed position, said first lure portion cooperating with said second lure portion to form the appearance of a substantially unitary lure for the purpose of attracting a fish.

3,975,857
RODENT TRAP

Donald M. Branson, Rte. 1, Box 75, Brandon, S. Dak. 57005, and Kermit A. Klitzke, 227 Tenth Ave., Worthington, Minn. 56187

Filed May 12, 1975, Ser. No. 576,455
Int. Cl.² A01M 23/16
U.S. Cl. 43—61 13 Claims



1. A rodent trap comprising:
a. a housing of predetermined longitudinal dimension defining an enclosure, the housing having a door opening in one end thereof which is oblique relative to the housing;
b. a door hingedly attached to said housing adjacent said oblique opening and operable to close the opening;
c. means attached to said door for normally urging said door to its closed position;
d. means associated with said door and said housing for forming an air tight seal when said door is in its closed position;
e. an abutment member attached to said housing;
f. a door prop member having one end connected to said door and having a shoulder formed therein for normally engaging said abutment member to hold said door in its open position;
g. a flat treadle platform having first and second ends disposed within the housing with the first end proximate the door opening, the treadle platform being pivotally mounted intermediate its ends above the housing floor, the second end of the treadle platform adapted to receive rodent bait;
h. and a trip lever having one end connected to the treadle platform between said intermediate point and the first end thereof and having its other end disposed for engagement with said door prop member, the trip lever adapted to engage and move said door prop off said abutment member in response to pivoting of said treadle platform, whereby the door is caused to close in response to a rodent entering the trap.

3,975,858
TOY CONSTRUCTION FABRICATING MEMBER AND ASSEMBLAGE

Joe Much, 1000 N. Lake Shore Drive, Chicago, Ill. 60611

Filed Aug. 29, 1974, Ser. No. 501,751
Int. Cl.² A63H 33/10
U.S. Cl. 46—26 8 Claims

1. A toy assemblage comprising an assembly of at least two toy construction fabricating members, each defining a plurality of bores extending through said fabricating member and a plurality of holes extending inwardly of said fabricating member, each surface of said fabricating member being penetrated by at least one of said holes or bores, each said fabricating member further defining means to provide for limited resilient expansion of at least some of said holes and bores when members complementary thereto are force-inserted thereinto whereby said force-inserted members are firmly gripped, said means comprising a plurality of bore slits for some of said bores and a plurality of hole slits for some of said holes, each said bore slit extending inwardly from a surface of said fabricating member to a said bore and each said hole slit extending inwardly from a surface of said fabricating member to a said hole, each said slit extending in a plane parallel to the axis of its associated bore or hole and intersecting its associated surface and associated bore or hole along a distance of at least

half the length of its associated hole or bore, and a complementary connecting member of a size adapted to be resiliently retained in one of said slit bores or holes of two of said fabricating members.

3,975,859
METHOD AND MEANS FOR COVERING LOW PLANT GROWTHS

Jean-Pierre Muller, Hauterive, Switzerland, assignor to Breveteam S.A., Fribourg, Switzerland

Filed May 21, 1975, Ser. No. 579,421
Int. Cl.² A01G 13/02
U.S. Cl. 47—31 15 Claims

1. A method for horticultural protection of plant growth during the maturation thereof whereby there is provided an interchange of oxygen, carbon dioxide and moisture between the area surrounding the plant growth and the ambient environment, comprising the steps of:
a. placing a resiliently deformable, perforate web capable of transverse expansion over ground having seeds or seedlings therein which, upon development, will present primary foliage of a dimension greater than the largest dimension of the individual perforations of said web;
b. securely affixing the peripheral edges of said web to the ground such that said web is retained in place over said ground but is yet capable of sufficient transverse expansion to envelop said plant growth during maturation; and,
c. allowing said plant growth to mature substantially completely beneath said web causing said perforations of said web to expand thus permitting transverse expansion thereof in response to maturation of said plant growth and allow greater volume exchange of oxygen, carbon dioxide, and moisture in accordance with an increasing demand thereof due to said maturation.

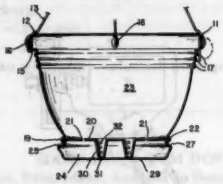
3,975,860
PLANTER AND RESERVOIR

Harold Harned, Reidsville; William G. Hilliard, Whitsett, and Clayton G. Williams, Reidsville, all of N.C., assignors to Zarn, Inc., Reidsville, N.C.

Filed Aug. 21, 1975, Ser. No. 601,390
Int. Cl.² A01G 27/00
U.S. Cl. 47—38.1 7 Claims

1. A blow-molded plastic planter and reservoir comprising; a tapered shell having an upper potting medium-receiving

section and a bottom water-receiving reservoir section, said upper section having an upper inturned lip and at least one circumferential radiused rib spaced from said lip, an intermediate bowl section, an outwardly extending radiused rib adjacent to said reservoir section below said intermediate bowl section adjacent to said reservoir section forming a partition-supporting internal rim, a flared base extending circumferentially in spaced vertical relation to said outwardly extending rib and at least having the same circumferential extent thereof forming an indentation between said outwardly extending rib and said flared base, at least one opening in said indentation communicating with said reservoir section beneath said partition supporting internal rim, and a partition mounted in said internal rim.



3,975,861

AUTOMATED PARKING GATE AND CONTROLS

Paul A. Baump, and Mario Marinaccio, both of Los Angeles, Calif., assignors to Greer Hydraulics, Inc., Los Angeles, Calif.

Filed May 6, 1974, Ser. No. 467,070
Int. Cl.² E05F *15/10*
U.S. Cl. 49—28 **17 Claims**

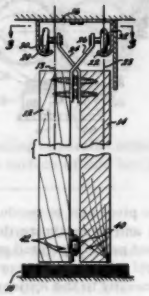
1. An automatic access control assembly comprising:
a. an access control member movable between an access-denying position and an access-permitting position;
b. an electric motor having an output member which is adapted to be rotated in a forward direction and in a reverse direction;
c. coupling means between said output member and said access control member for moving said access control member between its said access-denying position and its said access-permitting position in response to operation of said motor;
d. control means connected to said motor for controlling operation of said motor; said control means comprising electric circuit means including;
1. means for operating said motor in response to a first predetermined signal to rotate said output member in its said forward direction to move said access control member from its access-denying position toward its access permitting position;
2. means for operating said motor in response to a second predetermined signal to rotate said output member in its said forward direction to move said access control member from its access-permitting position toward its access-denying position; and
3. means for operating said motor in response to a predetermined signal to rotate said output member in its said reverse direction to move said access control member toward its access-permitting position.

3,975,862

HANGING OF SLIDING DOORS

Troy L. Doan, 924 Phillips, Vista, Calif. 92083

Filed June 12, 1975, Ser. No. 586,236
Int. Cl.² E05D *13/02*
U.S. Cl. 49—409 **10 Claims**



1. The improvement in a sliding door assembly in which at least first and second similar sliding doors are hung by roller means depending from track means, comprising:
a. said track means including at least first and second spaced apart tracks, said first door being hung by its roller means solely from said first track and said second door being hung by its roller means solely from said second track,
b. each door being hung with its central upright plane spaced from the vertical plane which includes the track from which it is hung so that the lower margin of the door will tend to swing toward that vertical plane, and
c. the vertical plane which includes said first track being spaced from the central upright plane of said first door in the direction of the central upright plane of the second door and the vertical plane which includes said second track being spaced from the central upright plane of said second door in the direction of the central upright plane of the first door, whereby the lower margins of said doors tend to swing into abutment and whereby said doors tend to be stabilized in normal position in generally vertical orientation with their lower margins pressed against each other with equal forces, and said doors have combined resistance to displacement of the lower portions of the doors from said normal position in directions normal to said planes due to shifts of door centers of gravity in a manner having combined resistance to that displacement, without a requirement for door guides therebelow.

3,975,863

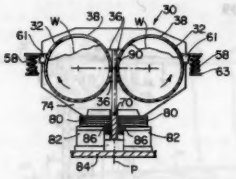
VIBRATORY APPARATUS AND METHOD

Max Isaacson, and Benjamin Smilg, both of Dayton, Ohio, assignors to Vibrodyne, Inc., Dayton, Ohio

Filed Aug. 26, 1974, Ser. No. 500,354
Int. Cl.² B24B *31/06*
U.S. Cl. 51—163.1 **8 Claims**

1. Vibratory apparatus for treating parts and the like, comprising a frame, rigid tub means defining at least two treating chambers each adapted to receive a corresponding work load of parts and treating media, each of said treating chambers having a substantially horizontal center axis about which the corresponding work load orbits, spring means mounted on said frame and connected to said tub means, said tub means and said spring means forming a substantially tuned oscillatory tub system having a predetermined frequency and a predeter-

mined center of gravity, said spring means supporting said tub system for oscillation on an effective pivot axis extending between said chambers and within a plane passing substantially through said center orbital axes of said chambers, said center of gravity of said tub system coinciding substantially



with said effective pivot axis to produce a neutrally statically stable tub system and to minimize the moment of inertia of said tub system, and power operated means for oscillating said tub system on said effective pivot axis and at a frequency corresponding generally to the resonant frequency of said tub system when said chambers are loaded.

3,975,864

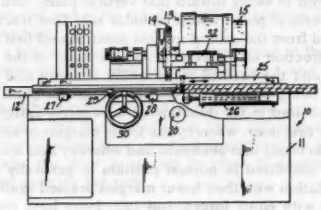
GRINDING SYSTEM

John J. Glowacki, Orange, Conn., assignors to J. J. Glowacki Associates, North Branford, Conn.

Filed Aug. 8, 1973, Ser. No. 386,835

Int. Cl.[2] B24B *19/18*

U.S. Cl. 51—165.87 **6 Claims**



1. Apparatus for grinding points on the ends of tubes to produce cannulas including a grinding machine having a grinding wheel thereon, a table, means for moving said grinding wheel toward and away from said table, said tubes acting to dress the wheel and reduce the diameter thereof, means for relatively moving the table past the cutting surface of the wheel; a fixture on said table adapted to hold a plurality of aligned tubes positioned at a small angle to the vertical and present the ends thereof to the cutting surface of the wheel, control means for causing said means for moving to advance said wheel a predetermined increment toward the tubes upon each relative movement of the table past the wheel, wheel surface sensing means positioned on said table and adapted to sense a predetermined position of the wheel surface, means responsive to said sensing means for halting further advance of the grinding wheel, said control means being arranged thereafter to retract said grinding wheel so that the cutting surface of the wheel upon retract is a fixed distance from said wheel surface sensing means.

3,975,865

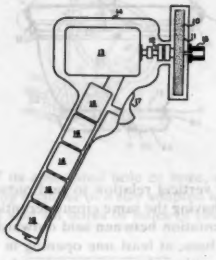
FIBER OPTIC GRINDING AND POLISHING TOOL

Adolph L. Lewis, La Mesa, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 27, 1975, Ser. No. 580,856

Int. Cl.[2] B24B *23/00*

U.S. Cl. 51—170 T **4 Claims**



1. A hand-held fiber optics grinding and polishing tool comprising:

a disc member having a circular planar surface with multiple discrete concentric sections, each section having a different degree of abrasive surface including at least one grinding section and a polishing section;

a shaft centrally affixed to said disc member;

motor means mounted in a hand-held body member for rotatably driving said shaft and said disc member; and

a selectively replaceable fiber optic cable guide removably supported on said body member and having multiple ports to receive fiber optic cable ends of known cross-sectional size, said ports being aligned with respective concentric sections and having shoulder portions sequentially graduated in depth relative to said concentric sections to support said fiber optic cable ends at predetermined positional depths for producing sequentially progressive amounts of grinding and polishing and the desired finished length of polished fiber optic cable end.

3,975,866

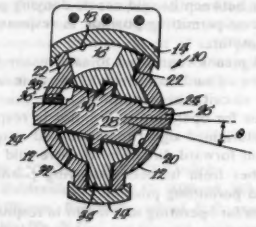
METHOD AND APPARATUS FOR MACHINING HOUSING FOR SLANT AXIS ROTARY MECHANISMS

Donald F. Walker, Leamington, England, assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Nov. 24, 1975, Ser. No. 634,814

Int. Cl.[2] B24B *5/16*

U.S. Cl. 51—281 R **8 Claims**



1. A method of machining an end surface for a housing for a slant axis rotary mechanism having a slant angle of θ and a rotor-to-shaft-to-housing timing ratio of $S_R/S_S/S_H$ comprising the steps of:

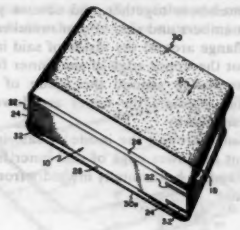
providing a grinding tool at a fixed predetermined area,
rotating a housing having an end surface to be machined about its central axis at a first rate of rotation R_1 with the end surface engaged by said tool, and
simultaneously rotating the housing about a second axis intersecting said central axis at an angle θ at a second rate of rotation R_2,
said rates of rotation being chosen according to the following relations:
$R_1 = n(S_H - S_R)$, and
$R_2 = n(S_K - S_R)$,
where n is an arbitrarily selected average angular velocity component.

3,975,867
HAND-HELD GEM DOP
George Dotson, Bliss, Idaho, assignor to Dotson and Evans Inc., Bliss, Idaho
Filed May 27, 1975, Ser. No. 580,621
Int. Cl.² B24B 9/16
U.S. Cl. 51—229 8 Claims

1. A hand-held gem dop comprising:
a. a slender hollow tubular handle having a cup-like upper cavity communicating with an unthreaded cylindrical cavity, communicating with a threaded cylindrical cavity:
b. a short rod-like member having a lower threaded portion adapted to thread into the threaded cavity of the tubular handle and an upper portion having a transverse opening therein to accommodate a pin;
c. a pair of opposed angular jaws having pin openings near the forward edge of a base portion, upper members at a sharp angle to said base members having gem gripping means said base portion and upper members integrally joined to form the angular jaws;
d. pin means joining the upper portion of said short rod-like member to said angular jaws and spring means biasing said angular arms away from one another, said short rod-like member screwable into said hollow handle to cause at least a portion of the base members of said angular members to contact the upper rim surface of the cup-like cavity to cause the upper members of the angular arms to move towards one another.

3,975,868
SANDING DEVICE
Lloyd Botimer, 2122 Adams Blvd., Saginaw, Mich. 48602
Filed July 7, 1975, Ser. No. 593,883
Int. Cl.² B24D 15/04, 17/00
U.S. Cl. 51—358 8 Claims

1. A sandpaper holder comprising a block-like body having parallel top and bottom surfaces, opposed longitudinal side surfaces on said body, flat opposite end surfaces on said body lying in planes normal to said top and bottom surfaces and convergently inclined relative to the longitudinal centerline of said body, and means defining a slot extending inwardly of said body from each of said opposite end surfaces, said slots extending transversely of said body from one of said longitudinal side surfaces to the other and each having an opening at



said end surfaces extending in parallel adjacently spaced relationship to the bottom surface of said body.

3,975,869
SPORTS COMPLEX
James Bouton, 267 Maple St., Englewood, N.J. 07631
Filed Nov. 18, 1974, Ser. No. 524,917
Int. Cl.² E04H 3/12
U.S. Cl. 52—9 8 Claims

1. A stadium complex having four stationary stands and four movable stands combined to surround a field of maximum area when in a first position, two of said stationary stands being in facing relationship on opposite sides of an imaginary line passing longitudinally through said field, and being of substantially equal longitudinal extent, the other two of said stationary stands also being in facing relationship on opposite sides of said longitudinal line and also being of substantially equal longitudinal extent but of lesser extent than said first two stationary stands, two of said movable stands being in facing relationship on opposite sides of an imaginary line passing transversely through said field and being of substantially equal transverse extent, one of said two movable stands in said first position being located between said first two stationary stands and the other of said two movable stands being located between said other two stationary stands, and said other two movable stands being in facing relationship with each being positioned, in said first position, between a stationary stand of longitudinal extent and a stationary stand of lesser longitudinal extent.

3,975,870
FLOOR HATCH
Hiromitsu Naka, No. 39, Oaza Shinmachi, Yashio, Saitama, Japan
Filed Sept. 5, 1974, Ser. No. 503,519
Int. Cl.² E02D 29/14
U.S. Cl. 52—20 5 Claims

1. A floor hatch comprising:
a quadrilateral outer framework adapted to be installed in a building floor and having an abutment face at the upper end of the inner surface of said outer framework; and
a cover assembly fitted in said outer framework, said cover assembly including:
a quadrilateral inner framework for supporting said cover assembly in said outer framework and having an abutment face on the outer surface of said inner framework

for sealingly engaging against said abutment face of said outer framework;

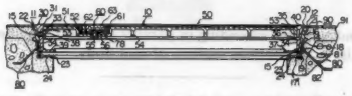
said inner framework having four elongated inner framework members and corner members connecting said framework members together and screws joining said framework members and said corner members;

an upper end flange around the inside of said inner framework adjacent the upper edge of said inner framework;

an intermediate flange around the inside of said inner framework intermediate the upper and lower edges of said inner framework;

a lower end flange around the inside of said inner framework adjacent the lower edge of said inner framework;

said flanges extending horizontally inwardly from said inner framework and



a cover member engaged between a pair of adjacent flanges and fixed in said inner framework between said adjacent flanges for closing the opening in the inner framework;

each of said flanges being spaced from an adjacent flange a distance substantially equal to the thickness of the edge of said cover member, whereby the cover member is held in the inner framework between a pair of adjacent flanges without the necessity of any fastening means and when the cover member is between the upper and intermediate flanges, the upper surface of the cover member is substantially flush with the floor around the outer framework so that a floor covering can be placed on the floor hatch, and when the cover member is between the intermediate and lower flanges there is a space between the cover member and the top edges of the inner and outer frameworks which can be filled with concrete or the like for providing a surface level with the floor surface around the floor hatch.

3,975,871

DWELLING WITH PLURAL LEVELS AND STORED FURNITURE

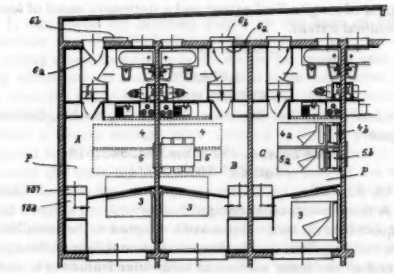
Andre Ghionda, 43 Avenue Mendiguren, 06 Nice, France

Filed June 20, 1975, Ser. No. 588,879

Claims priority, application France, June 20, 1974, 74.22170; Dec. 12, 1974, 74.41702

Int. Cl.² A47C 17/26

U.S. Cl. 52—36 **10 Claims**



1. A dwelling having several levels and including a raised floor, means mounting a portion of the raised floor for rotation about a horizontal axis, a bed on one side of said floor portion, and means for releasably retaining said floor portion against rotation.

3,975,872

SYSTEM OF ARTICULATED PLANES

Emilio Perez Pinero, deceased, late of Calasparra (Murcia), Spain, by Consuelo Belda Aroca, legal heir

Continuation-in-part of Ser. No. 314,722, Dec. 13, 1972. This application Feb. 3, 1975, Ser. No. 546,634

Claims priority, application Spain, Dec. 14, 1971, 397,963

Int. Cl.² E04B 1/344

U.S. Cl. 52—71 **6 Claims**

1. A system of folding planes comprising:

a first plurality of planes, each plane being substantially rectangular and having parallel and opposite first and second edges and parallel and opposite third and fourth edges, said planes forming a first series of plane members adapted to be folded from an expanded position lying in a common plane to a substantially parallel stacked position;

first hinge means comprising hinges coupling adjacent plane members in said first series together such that the first edge of each plane member is hinged to the second edge of an adjacent plane member in the series;

a second plurality of plane members similar to that of said first series and forming a second series of plane members;

second hinge means comprising hinges coupling adjacent plane members in said second series together such that the first edge of each plane member is hinged to the second edge of an adjacent plane member in the series;

at least one additional plurality of planes similar to that of said first series and forming at least one additional series of planes;

at least one additional hinge means comprising hinges coupling adjacent planes in said at least one additional series together such that the first edge of each plane is hinged to the second edge of an adjacent plane in the series;

a first pantographic framework having a plurality of crossed first and second arms, each of said first arms pivotally coupled at a first end to the third edge of a plane member in one series and coupled to a second end to the fourth edge of a plane member in an alternate series such that said first hinge means is aligned with said second hinge means in the direction of expansion and contraction of said pantographic framework;

a second pantographic framework having a plurality of crossed third and fourth arms, each of said third arms pivotally coupled at a first end to the third edge of a plane member in said one series and coupled at a second end to the fourth edge of a plane member in said alternate series, said first and second pantographic frameworks being spaced to connect to alternate hinges of each hinge means;

said pantographic crossed arms being pivotally connected together at their approximate centers, the ends of said arms being pivotally coupled to the ends of an adjacent pair of crossed arms;

wherein, when said pantographic frameworks are in expanded positions and said hinge means are in an open position, the plane members all lie in a common geomet-

ric plane with the first and second edges of adjacent plane members in each series abutting, and with the third edge of each plane member abutting the fourth edge of the plane member in an adjacent series, and wherein, when said pantographic frameworks are in contracted positions and said hinge means are in a closed position, the plane members of adjacent series lie substantially parallel to one another, with the plane members of each series nested in a substantially parallel stacked position in accordion-like fashion.

3,975,873

PREFABRICATED BUILDING SECTIONS OR ROOM UNITS AND METHODS FOR THEIR USE IN ERECTING BUILDINGS

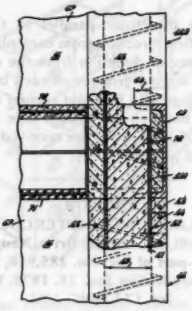
Cornelis van der Lely, 7, Bruschenrain, Zug, Switzerland

Filed Aug. 20, 1973, Ser. No. 389,818

Claims priority, application Netherlands, Aug. 21, 1972, 7211388

Int. Cl.² E04H *1/04*

U.S. Cl. 52—79 **30 Claims**



1. A box-shaped prefabricated section of a type to be included in a vertical stack of similar sections which form a completed multistory building, said section comprising a framework of beams which includes vertical metal beams which extend from the bottom to the top of the section and horizontal metal beams connecting said vertical metal beams at least along the lower aspects of said vertical metal beams, said lower horizontal beams defining at least in part the lowermost bottom side of the sections, said lowermost side of the section coincident with a horizontal plane which also defines the lowermost edges of said vertical beams which are spaced inboard from the periphery of said lowermost side of the section, said periphery being defined by said horizontal metal beams, said vertical beams each being embraced by fireproof material throughout substantially its entire length from the bottom to the top of the section including the space between each said vertical beam and said periphery and being adapted to join on at least one end with directly a similar vertical beam entirely embraced by fireproof material whereby whole columns are formed by said vertical beams throughout the entire height of the completed building which are protected with fireproof material throughout their entire length.

3,975,874

SWIMMING POOL MODULAR CONSTRUCTION

Donald H. Witte, and Donald H. Weir, both of York, Pa., assignors to Fox Pool Corporation, York, Pa.

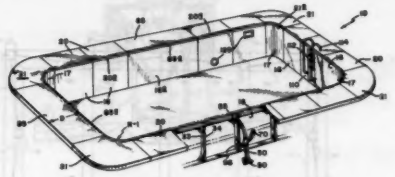
Filed Feb. 20, 1974, Ser. No. 444,027

Int. Cl.² E04H *3/18, 3/16*

U.S. Cl. 52—169 R **18 Claims**

1. A swimming pool comprising: wall modules of synthetic resinous composition having opposite integrally formed end flanges at the sides adapted to mate and form a juncture with the end flanges of adjoining wall modules, said end flanges being provided with brace locating and aligning elements integrally formed thereon;

a brace attached at one side interlocked in the brace locating element of said wall modules and extending substantially radiallly therefrom for supporting and aligning said



wall modules in substantially vertical position; interlocking means integrally formed on said brace to secure together a joined pair of said wall modules at their juncture and on said brace locating elements of said wall modules, and means to secure the other side of said brace, remote from said wall module, in a footing.

3,975,875

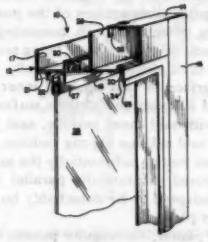
DECORATIVE EXTERIOR TRIM SYSTEM FOR WINDOWS

Lorane C. Goss, Jr., Mechanicsburg, Pa., assignor to Capitol Products Corporation, Mechanicsburg, Pa.

Filed Sept. 30, 1974, Ser. No. 510,399

Int. Cl.² E06B *1/18*

U.S. Cl. 52—211 **10 Claims**



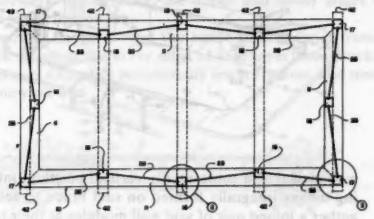
1. An exterior decorative trim system for fin type window frames: comprising, a window frame having a nailing fin thereon, an elongated angular trim shape adapted to be positioned on said window frame, groove means integrally formed on said window frame for receiving insertion means on one end of said trim shape, insertion means on said one end of said trim shape for insertion in said groove receiving means on said window frame, clip means for fastening the other end of said trim shape to said nailing fin on said window frame, a first means on said clip means for clip-on fastening of said clip means on said nailing fin of said window frame, a second means on said clip means for clip-on fastening of said clip means on said other end of said trim shape, means on said other end of said trim shape for insertion into said second fastening means on said clip means, said clip means being a unitary member and said first fastening means and said second fastening means being integrally formed thereon, and said second fastening means extending angularly from said first fastening means, whereby, when said one end of said trim shape is inserted in said groove receiving means on said window frame, and said clip means is fastened on said nailing fin and on said other end of said trim shape, said trim shape is locked on said window frame and forms a box-like frame thereon.

3,975,876

WOOD FRAME BUILDING WALL

Reinhold Sauder, 7315 8 Ave., Regina, Saskatchewan, Canada (S4T 0X2)

Filed Mar. 4, 1975, Ser. No. 555,272
Int. Cl.² E04B 1/00, 5/00
U.S. Cl. 52—282 10 Claims



1. A peripheral wall assembly for a wood frame building, comprising:

a. a substantially horizontal wall sill member including a top, generally horizontal upper surface and longitudinal, generally vertical and inner surfaces parallel with one another, said sill member forming the base of said wall assembly;

b. a plurality of upright posts including corner posts and adapted to be detachably but firmly secured to said top surface of the sill, said posts being heavy timber pieces of rectangular cross section, each of the posts thus having four substantially planar, vertical surfaces;

c. the distance between said two longitudinal surfaces of the sill being greater than the length of sides of said substantially rectangular cross section of the posts;

d. said plurality of upright posts consisting of outer posts and inner posts; said outer posts being secured to said sill with one of their surfaces substantially coincident with said outer surface of said sill, said inner posts being secured to said sill with one of their surfaces substantially coincident with said inner surface, said posts being disposed along said sill in a zig-zag fashion;

e. an upper plate having substantially the same shape as the sill and disposed substantially parallel with same, said posts being adapted to be detachably but firmly secured to said upper plate;

f. substantially planar, rectangular panels; made of fibrous material such as wood;

g. each of said wall panels being maintained in said wall assembly solely by being releasably received with its peripheral edges in grooves provided in side surfaces of two adjacent posts, in the portion of said sill extending between the said posts and in the portion of said upper plate extending between said posts, with the wall panel thus extending between a pair of two adjacent posts, one post of said pair being the outer post, the other post of said pair being the inner post, and between said portions of the sill and of the upper plate.

3,975,877

PANEL JOINING DEVICE

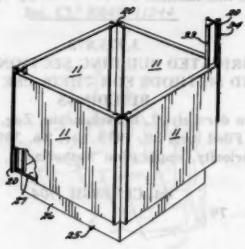
Donald R. Walton, 934 W. 17th St., Costa Mesa, Calif. 92627

Filed Apr. 21, 1975, Ser. No. 569,698
Int. Cl.² E04B 1/40; F16B 12/00
U.S. Cl. 52—282 8 Claims

1. Apparatus comprising:

two adjacent panels both having expansive parallel interior and exterior faces and perpendicular edge surfaces extending therebetween at the peripheries thereof and including a first groove formed in an interior face of each panel along one edge thereof and a second groove formed in an adjacent edge surace and extending perpendicular to said first groove; and

an extrusion formed having a cross sectional configuration of two intesecting perpendicular planes, each plane including a first ridge formed to project in a first direction and parallel to the other plane and a second ridge disposed on each of said planes distal to said first ridge across the intersection of said planes to project in a second direction therefrom parallel to the other plane, whereby said first direction from each plane is perpendicular to said second direction from the other plane, and said first and second grooves of each of said panels respectively engage said first and second ridges of a plane in the corner between the interior face and the adjacent edge surface of a panel and are received within the intersection of said planes.

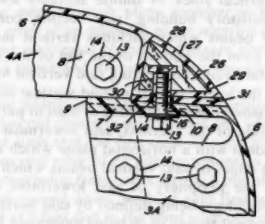


3,975,878

MODULAR BUILDING WITH INTERLOCKING PANELS

Donald W. Modarelli, Jr., 406 Ilse Drive, Newark, Del. 19711

Continuation-in-part of Ser. No. 285,958, Sept. 5, 1972, abandoned. This application Jan. 15, 1975, Ser. No. 541,374
Int. Cl.² E04G 1/02
U.S. Cl. 52—285 5 Claims



1. A prefabricated modular building including a first external wall portion and a first external roof portion, each portion comprising at least two molded, lightweight structural panels, each panel including a generally planar portion having a plurality of sides and a flange extending along the full length of each side and continuously about the entire periphery of said planar portion, said flange projection generally normally from said flange, with the peripheral edge of said flange being of increased thickness, said panels being connected to each other, with the peripheral edge of a portion of the flange of one panel abutting the peripheral edge of a portion of the flange of another panel and with gasket means disposed within the space between the flange portions contiguous with the abutting edges, the portion of each flange lying along each side of the panel including interlock means comprising a recess in the outside surface of the increased thickness peripheral portion of said flange portion and having an opening therein and a tab extending from said outside surface and spaced from said recess and having an opening therein, such

that when said panels are connected together the tab of one portion of one flange is disposed within the recess in one portion of the abutting flange with said openings aligned, said panels being secured to one another by at least one bolt extending through the aligned openings in said abutting flange portions at said interlock mean and perpendicular to said flange portions.

3,975,879

THERMAL INSULATION

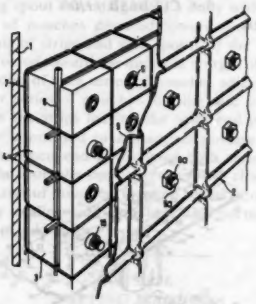
William Birch, Holmes Chapel; Roger Alexander Stuart; Robert Ian Facer, both of Knutsford, and John Graham Durston, Leftwich, all of England, assignors to The Nuclear Power Group Limited, Warrington, England

Filed Oct. 25, 1974, Ser. No. 518,200

Claims priority, application United Kingdom, Oct. 31, 1973, 50718/73

Int. Cl.² E04B *1/74, 1/80;* G21C *11/00*

U.S. Cl. 52—404 **9 Claims**



1. A liquid metal cooled nuclear reactor vessel comprising a metallic primary containment vessel, the inside of which is lined by insulation defined by a layer of insulating blocks spaced from the wall of the vessel, the blocks being spaced apart and each block being individually and rigidly secured to the wall of the vessel, resilient closure members substantially closing the interspaces between the blocks against convectional flow of liquid, and a metallic membrane covering for the layer of blocks, the covering having venting means to allow liquid from the interior of the vessel to penetrate between the covering and the wall of the containment vessel to facilitate pressure testing of the reactor construction and prevent water, used during hydraulic pre-commissioning tests, from being secreted in gas pockets in the insulation.

3,975,880

SHEET METAL BATTEN ROOF OR SIDING

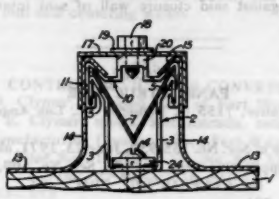
Harry F. Fischer, Jr., Pittsburgh, Pa., assignor to All-State Industries, Inc., McKees Rocks, Pa.

Filed Apr. 28, 1975, Ser. No. 571,915

Int. Cl.² E04D *1/36;* E04C *1/34*

U.S. Cl. 52—464 **6 Claims**

1. In a sheet metal roof or siding, supporting means, a row of longitudinally spaced channel-like brackets secured to said supporting means, each bracket having spaced side walls with flanges extending downwardly from the tops of said walls, a gutter extending through said brackets and supported thereby, a clip overlying the gutter in each bracket and hooked under said bracket flanges and engageable therewith, sheet metal pans on said supporting means at opposite sides of the gutter and having side portions extending upwardly beside said brackets, the upper marginal areas of said side portions being turned inwardly over said clips and gutter, a cap above the gutter and clips and extending lengthwise of the gutter and having downwardly extending side flanges overlapping said side portions of the pans, the central portions of said clips engaging the lower surface of the cap, the central portion of each clip extending above the rest of the clip to provide clearance between said cap and clip for said upper marginal areas



of said pan side portions, and screws extending down through the cap and into said central portions of the clips to fasten the cap to the clips, the cap and at least most of the clips being freely slidable lengthwise together relative to the pans and brackets during thermal expansion and contraction.

3,975,881

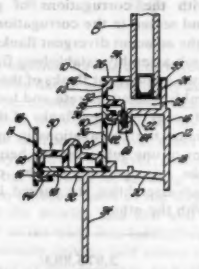
WINDOW ASSEMBLY

James Ninowski, Jr., 558 Kingsley Trail, Bloomfield Hills, Mich. 48013

Filed Mar. 13, 1975, Ser. No. 558,128

Int. Cl.² E06B *3/54*

U.S. Cl. 52—498 **6 Claims**



1. A window frame assembly comprising: an exterior frame member including a plurality of walls defining three sides of a box-like structure as viewed in cross section; said walls including an outwardly facing wall, an outer wall for abutting a window opening in a structure, and an inner wall parallel to and spaced inwardly from said outer wall; an interior frame member including a closure wall for defining the fourth side of the box-like structure; cooperating locking means integral with each of said frame members for locking said frame members together and including a first pair of male and female snap-in members interconnecting said inner wall of said exterior frame member and said closure wall of said interior frame member; a panel-receiving channel partially defined by said exterior frame member; a locking channel formed in said inner wall of said exterior frame member adjacent said panel-receiving channel and adjacent said first pair of male and female locking members; and finish strip means removably joined to said exterior frame member for completing said panel-receiving channel; said finish strip means including a locking leg receivable within said locking channel, a base wall connected to said locking leg and extending away from said exterior frame member and in supported engagement with said wall of said interior frame member, a retainer wall generally parallel to and spaced inwardly from said base wall which terminates in a free edge completing said panel-receiving channel, and a connecting wall connecting said base wall and

said retainer wall, said connecting wall being spaced from said locking leg and located in substantially the same plane as said closure wall of said interior frame member whereby a force path is established through said retainer wall, said connecting wall, and said base wall such that forces acting on said retainer wall react against said closure wall of said interior frame member.

3,975,882

PANEL STRUCTURE

James A. Walter, 7155 N. Figueroa St., Los Angeles, Calif. 90042

Continuation of Ser. No. 155,939, June 23, 1971, abandoned. This application Sept. 2, 1975, Ser. No. 609,376

Int. Cl.[2] E04B 1/02; E04C 1/04

U.S. Cl. 52—571 16 Claims

1. An elongate rigid panel structure of selected longitudinal curvature comprising a pair of elongate flexible sub-assemblies, each sub-assembly including a flat skin with inner and outer surfaces and a corrugated backing fixed to the inner surface of the skin, the corrugations of the backing extending normal to the longitudinal axis of the sub-assemblies and each corrugation having angularly related inwardly convergent flanks, the sub-assemblies being arranged in back to back relationship with the corrugations of each sub-assembly meshed with and seated in the corrugations of the other sub-assembly with the adjacent divergent flanks of adjacent corrugation of each sub-assembly establishing flat opposing engagement with the two convergent flanks of the corrugations of the other sub-assembly related thereto and locking means on and between the adjacent opposing flanks of the meshed corrugations and retaining the corrugations in meshed relationship, the corrugations of one sub-assembly being greater in lateral extent than the corrugations of the other sub-assembly whereby the sub-assemblies are curved longitudinally when engaged one with the other.

3,975,883

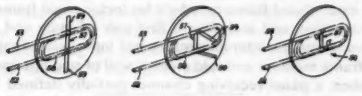
COILING AND BINDING STRAND MATERIAL

George Frank Besnyo, Towson, and Byron Lee Small, Parkville, both of Md., assignors to Western Electric Company, Inc., New York, N.Y.

Filed Apr. 30, 1975, Ser. No. 573,272

Int. Cl.[2] B65B 63/04

U.S. Cl. 53—3 16 Claims



1. A method of forming bound coils of cordage, which includes the steps of:

supporting a tie in one work position;

winding a plurality of convolutions of cordage in the one work position to form a coil such that the tie spans generally diametrically the convolutions with end portions of the tie extending beyond opposed portions of the convolutions and such that leading and trailing ends of the cordage are oriented in the same direction; while

reforming a tie in another work position spanning generally diametrically the convolutions of a previously wound coil of cordage to move each end portion of the tie into enclosing securing relationship with associated corresponding portions of the plurality of convolutions to bind together the corresponding portions;

removing the bound coil of cordage from the other work position;

positioning another tie in the other work position; and

moving the coil of cordage from the one work position to the other work position while moving the tie from the other work position into the one work position to facilitate another cycle of winding cordage in the one work position and binding the already wound coil of cordage in the other work position.

3,975,884

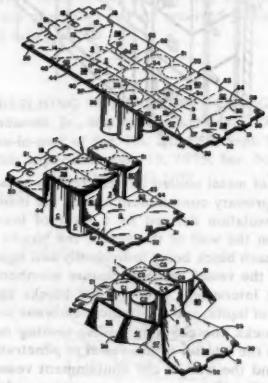
METHOD OF FORMING AND LOADING AN ARTICLE CARRIER

Homer W. Forrer, Jonesboro, Ga., assignor to The Mead Corporation, Dayton, Ohio

Division of Ser. No. 580,300, May 23, 1975, Pat. No. 3,955,745. This application Feb. 9, 1976, Ser. No. 656,630

Int. Cl.[2] B65B 11/00

U.S. Cl. 53—26 9 Claims



7. A method of forming and loading a basket style article carrier from a generally rectangular wraparound type blank having a longitudinal medial handle interconnected at its ends with side wall forming panels along transverse anchoring fold lines and having a pair of end wall forming panels disposed alongside opposite sides of said handle and interconnected at their ends with said side wall forming panels via interconnected web and supplementary side wall forming panels, the connection between each web panel and its associated supplementary side wall forming panel being along a transverse elevating fold line and the connection between each web panel and the associated side wall forming panel being along a diagonal fold line, the method comprising the steps of forming a group of articles in a rectilinear side by side arrangement, placing the blank atop the group of articles, holding the handle in fixed relation atop the group of articles with its ends disposed alongside the articles, elevating said end wall forming panels above the handle and the tops of the articles, and folding said end wall forming panels outwardly and downwardly to positions adjacent and alongside the end articles.

3,975,885

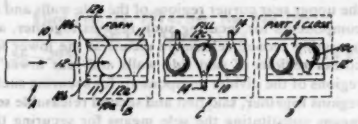
METHODS FOR PRODUCING FILLED CONTAINERS

Richard S. Carlisle, 1051 Broadway, Thornwood, N.Y. 10594

Continuation-in-part of Ser. No. 231,288, March 2, 1972, Pat. No. 3,815,794. This application Dec. 21, 1973, Ser. No. 427,433

Int. Cl.² B65B 3/02, 9/02

U.S. Cl. 53—29 11 Claims



1. The method of producing filled pouches, including the steps of making seams between mutually opposed thermoplastic strips defining two series of pouches each having an open-ended filling spout extending from a body with said spouts of one series of pouches directed toward one margin of the opposed pair of strips and said spouts of the other series of pouches directed toward the opposite margin of said strips and with the bodies of each series of pouches adjacent said spouts of the other series of pouches, cutting said pouches incompletely from the strips leaving the open end portion of each filling spout connected to a marginal portion of said strips, disposing the open end portions of both series of spouts in essentially horizontally opposite rows and charging contents into both series of pouches, forming seams across said spouts and thereby sealing said pouches, and parting said sealed pouches from said strips.

3,975,886

CAPPING MACHINE

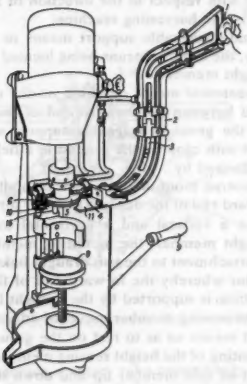
Sidney Walter Waters, Poole, England, assignor to Metal Box Limited, Reading, England

Filed Sept. 23, 1974, Ser. No. 508,664

Claims priority, application United Kingdom, Sept. 27, 1973, 45194/73

Int. Cl.² B65B 7/28; B67B 3/20

U.S. Cl. 53—310 10 Claims



1. In a capping machine, a housing defining a recess, a cap chuck disposed within said recess, a rotatable support carrying said chuck for rotating the same, said chuck having an end face, said end face including centering means for centering a cap relative to said chuck, a cap feed chute opening radially into said recess below said end face, said chute including fixed support means for temporarily supporting a foremost cap in a position partially underlying said chuck, and cap retaining means carried by said chuck independently of said centering means for attracting a foremost cap radially and axially of said end face into said centering means.

3,975,887

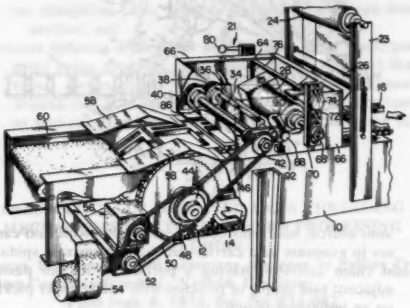
CONTROL DEVICE FOR CONVEYOR

Joseph D. Clymer, deceased, late of Fort Wayne, Ind., by Bonita E. Clymer, special administratix, assignor to Lincoln Manufacturing Company, Inc., Fort Wayne, Ind.

Filed Nov. 13, 1974, Ser. No. 523,327

Int. Cl.² B65B 7/16, 51/16

U.S. Cl. 53—373 11 Claims



1. In a packaging machine having a conveyor for conveying trays of foodstuff or the like in longitudinally adjacent relation along a generally horizontal path, first means including a sealing roller adjacent path and operable to apply a cover sheet to trays and to heat seal the cover sheet thereto during movement of the trays with the conveyor, second means in the form of a rotary cutter operable for severing the sheet sealed to the trays between adjacent ones of the trays, third means selectively operable for moving said first and second means away from the path of the trays into ineffective position, and drive means continuously driving said rotary cutter in timed relation to movement of the conveyor, in both the effective and ineffective positions of said rotary cutter, whereby trays of foodstuff may be selectively conveyed past the first and second means without being acted on thereby while still maintaining synchronization of the rotary cutter with the motion of the conveyor, and in which the conveyor comprises support members for supporting trays with the upper edges in alignment, chain means connected to said support members, a drive shaft, sprocket means on the drive shaft drivingly connected to the chain means, a first shaft supporting said rotary cutter and having a first gear thereon, a second shaft rotatable in the machine and having a second gear thereon meshing with said first gear, a sprocket on said second shaft drivingly connected to said drive shaft, said third means including arm means pivotal about the axis of said second shaft and rotatably supporting said first shaft.

3,975,888

METHOD AND APPARATUS FOR FORMING, FILLING AND SEALING PACKAGES

Wickliffe Jones, Cincinnati, Ohio, assignor to R. A. Jones & Company, Inc., Covington, Ky.

Division of Ser. No. 247,574, April 26, 1972, Pat. No. 3,851,751. This application Sept. 23, 1974, Ser. No. 508,528

Int. Cl.² B65B 43/30

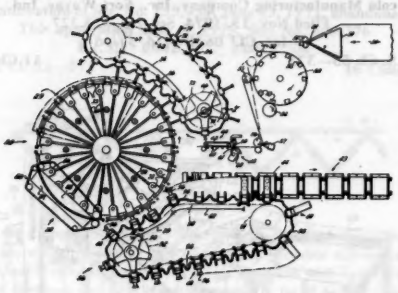
U.S. Cl. 53—386 9 Claims

1. Apparatus for opening a pouch for filling comprising.

a supply of individual pouches,

a generally circular filling conveyor having a plurality of vacuum carriers spaced about its periphery for movement in a circular path,

an endless chain conveyor having a plurality of vacuum carriers spaced around its periphery and serially interconnected by tubing forming an endless path for evacuating all of said carriers, said chain conveyor including a spider operatively associated with said conveyor for rotation therewith having a plurality of arms connected to a vacuum source, said arms being connectable with said carriers to evacuate said carriers as each passes said spider,



said chain conveyor having a portion of its run passing adjacent said supply of pouches with each carrier picking up an individual pouch,

said chain conveyor having a portion of its run, downstream from said supply, passing adjacent the periphery of said circular conveyor with the carriers of respective conveyors being in alignment with each other and following substantially the same circular path, the carriers diverging slightly to pull apart pouches captured between them.

3,975,889

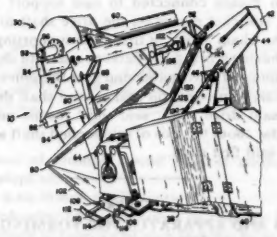
HARVESTING COMBINE AND SEPARATE QUICK ATTACH CROP PICKUP COMPONENTS THEREFOR

Dathan R. Kerber, Bettendorf, Iowa; Richard E. Benson, East Moline, and John L. VandeWiele, Moline, both of Ill., assignors to International Harvester Company, Chicago, Ill.

Filed Feb. 13, 1975, Ser. No. 549,583

Int. Cl.² A01D *47/00*

U.S. Cl. 56—2 **8 Claims**



1. In an agricultural implement, the combination with a harvester platform having a casing provided with a generally horizontal bottom wall having a forward edge, a pair of laterally spaced upstanding side walls presenting upwardly and rearwardly inclined forward edges, and a vertical rear wall provided with a crop infeed opening adapted for communication with a combine feeder;

a reel assembly operatively and removably secured to said platform casing, said assembly having a pair of divider components which are substantially coplanar with the platform side walls and having upwardly and rearwardly inclined rear edges which seat upon said inclined forward edges of said side walls whereby said side walls and divider components establish, in effect, composite divider members at the opposite sides of the platform, an elongated reel supported at opposite ends on said pair of divider components, cooperating first releasable means at the upper rear corner regions of the side walls and divider components for securing such regions together, and cooperating second releasable means at the lower forward corner regions of said side walls and rear lower corner regions of the divider components for securing such latter regions together, said first and second releasable securing means constituting the sole means for securing the reel assembly in its operative position on the platform casing.

3,975,890

AUTOMATIC HEIGHT CONTROL FOR HARVESTING MACHINE

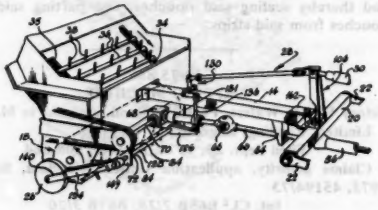
Alexander J. Rodger, Louwskraal, South Africa, assignor to Slattery Manufacturing (Proprietary) Ltd., Potgietersrus, South Africa

Filed Mar. 6, 1975, Ser. No. 556,072

Claims priority, application South Africa, Mar. 18, 1974, 74/1746

Int. Cl.² A01D *67/00*

U.S. Cl. 56—208 **7 Claims**



1. A crop harvesting machine comprising:

a main body;

a draught member located at the forward end of the main body with respect to the direction of usual forward motion of the harvesting machine;

a ground-engageable support means to support the main body, the support means being located rearwardly of said draught member;

crop treatment means mounted on the main body and located between the forward end of the draught member and the ground-engageable support means for engagement with crop on the ground in a field

characterized by

a transverse mounting member pivotally attached to the forward end of the draught member for pivotal movement about a vertical and a horizontal axis relative to the draught member, the mounting member being adapted for attachment to the two draught links of an agricultural tractor whereby the forward end of the crop harvesting machine is supported by the draught links;

a height sensing member mounted adjacent the crop treatment means so as to rest on the ground during use, the mounting of the height sensing member permitting movement of said member up and down in accordance with ground contours,

a mast pivotally attached to the transverse mounting member and being adapted for connection to a top link of a tractor, and

a linkage connected at one end to said height sensing member and connected at its other end to the mast pivotally

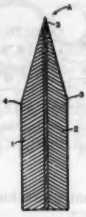
attached to transverse mounting member, the linkage being operative in use, to pivot the mast, and to set up compression or tension in said tractor top link in accordance with up and down movement of the height sensing member.

3,975,891

MOWER BLADES

Roland Eric Gunther, R.D. No. 1 Box 282, New Berlin, N.Y. 13411

Filed Feb. 22, 1974, Ser. No. 444,786
Int. Cl.² A01D *55/18*
U.S. Cl. 56—295 16 Claims



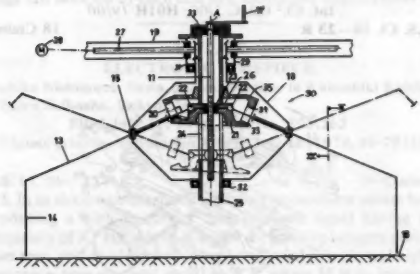
1. In a mower blade for use on rotary type mowers a flat steel body, said body having cutting portions at its extremities, each said cutting portion having a knife edge, each of said cutting portions further comprising a composite of a layer of comminuted hard material between two layers of steel, and disposed in a plane parallel to the flat surfaces of said steel body so as to extend into and substantially embody the knife edge of each of said cutting portions.

3,975,892

ROTARY RAKE FOR HAYING MACHINE USABLE FOR TEDDING AND WINDROWING

Ludger Heilkuhl, Gottmadingen, Germany, assignor to Maschinenfabrik Fahr Aktiengesellschaft, Gottmadingen, Germany

Filed Sept. 17, 1975, Ser. No. 614,220
Claims priority, application Germany, Sept. 18, 1974, 2444667
Int. Cl.² A01D *81/00*
U.S. Cl. 56—365 10 Claims



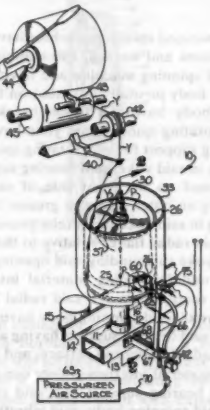
1. In a haying machine a rotary rake comprising:
a support adapted to travel along the ground in a transport direction;
a housing;
means supporting said housing for rotation on said support about an upright housing axis fixed in said support and passing through said housing;
an axially fixed rod in said housing lying on and rotatable about said housing axis and having a threaded portion;
a nonrotatable cam in said housing threaded on said portion, whereby rotation of said rod about said housing axis axially displaces said cam;
a plurality of bearings angularly spaced about said housing and each formed with a generally radially extending recess and each pivotal about a respective bearing axis tangential to an imaginary cylinder centered on said housing axis;
a plurality of rake elements each having
an inner end,
an elongated and straight inner section extending generally radially from said inner end and from said housing and radially slidably received in a respective one of said recesses,
a control arm on said inner section engageable with said cam, and
an elongated outer section extending from said inner section; and
means defining a pivot for each of said inner ends, each pivot being rotatable about said housing axis by a fixed radial distance and being orbitable at said distance around said housing axis, said pivots being fixed relative to said cam for joint displacement therewith along said housing axis.

3,975,893

PNEUMATICALLY OPERATED YARN THREADING MECHANISMS FOR TEXTILE YARN PROCESSING MACHINE

Gustav Franzen, Krefeld, Germany, assignor to Palitex Project-Company G.m.b.H., Krefeld, Germany

Filed Sept. 8, 1975, Ser. No. 611,082
Claims priority, application Germany, Dec. 30, 1974, 2461796
Int. Cl.² D01H *7/86, 1/10*
U.S. Cl. 57—34 R 8 Claims



1. In a textile yarn processing machine, such as a two-for-one twister or the like, having a plurality of spindle assemblies each including a driven rotor mechanism defining therewithin an elongate yarn passageway and a stationary carrier mechanism for carrying a hollow supply package of yarn and defining therewith an elongate yarn passageway joining with said rotor mechanism yarn passageway; the combination therewith of pneumatically operated threading mechanisms for automatically threading yarn withdrawn from the supply package through said passageways during threading-up of said spindle assembly and being characterized by a construction which eliminates the necessity of predetermined positioning of said

rotor mechanism for the threading operation, said pneumatically operated threading mechanisms comprising:

selectively operated, air injector nozzle means positioned at the juncture of said yarn passageways for creating an air suction through said carrier mechanism passageway and a jet of positive airflow through said rotor mechanism passageway for pneumatically threading of yarn through said passageways; and

means for selectively supplying air under pressure to said injector nozzle means regardless of the position of said rotor mechanism.

3,975,894

VIBRATION AND SOUND DAMPENING MEANS

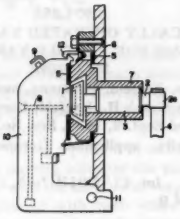
Yoshihisa Suzuki, Nagoya, Japan, assignor to Toyoda Automatic Loom Works, Ltd., Kariya and Daiwa Spinning Co., Ltd., Osaka, both of, Japan

Continuation of Ser. No. 428,228, Dec. 26, 1973, abandoned. This application June 4, 1975, Ser. No. 583,738

Claims priority, application Japan, Dec. 28, 1972, 47-481411

Int. Cl.² D01H 1/12

U.S. Cl. 57—58.89 8 Claims



1. In an open-end spinning machine having means for dampening vibrations and sounds, the combination comprising a yoke on said spinning machine and having a front side and a back side, a body pivotally mounted on the front side of said yoke, said body having a thread-break detector mounted thereon, a rotating spindle, said yoke having a through opening, a bearing support for said rotating spindle passing through said opening in said yoke, said bearing support having a radial flange disposed on the front side of said yoke, said radial flange having an outer diameter greater than the diameter of said opening in said yoke to thereby provide a flat overlapping section of said radial flange relative to the portion of the front side of said yoke surrounding said opening in said yoke, vibration and sound-dampening material interposed in said flat overlapping section between said radial flange and the front side of said yoke, said spinning body having a radially disposed flat surface, said bearing support having a longitudinal flat end facing said radially disposed surface, and vibration and sound-dampening material interposed between said longitudinal flat end of said bearing support and said radially disposed flat surface of said spinning body, said vibration and sound-dampening material having a generally flat base and on at least one face thereof a plurality of raised and depressed portions, said raised portions contacting the adjacent or abutting surface at spaced locations while said depressed portions provide spaces therebetween, said spacec being disposed to effect an interference between the sound waves generated at said depressed portions and the sound waves bounced back from said base, whereby said vibration and sound-dampening material insulates the vibrations caused by the rotating spindle from said yoke, said pivotal body, and said thread-break detector to preclude erroneous readings of the latter without releasing of rotating sounds.

3,975,895

OPEN-END SPINNING MACHINE WITH MEANS FOR SUPPLYING A SLIVER

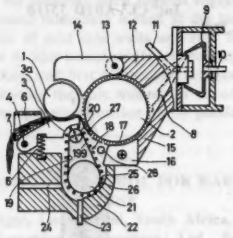
Fritz Stahlecker, Bad Uberkingen, Germany, assignor to Fritz Stahlecker and Hans Stahlecker, both of, Germany

Filed Mar. 7, 1975, Ser. No. 556,438

Claims priority, application Germany, Apr. 11, 1974, 2417736

Int. Cl.² D01H 1/12, 1/00

U.S. Cl. 57—58.95 14 Claims



1. An open-end spinning machine comprising:

a spinning rotor,

an opener roll,

a fiber supply channel leading from said opener roll to the spinning rotor,

means for supplying a sliver to the opener roll,

fiber guide surfaces having a removal opening associated to said opener roll in the area between said means for supplying the sliver and said fiber supply channel,

and a conveyor belt arranged in said removal opening and serving as a portion of said fiber guide surfaces moving in the direction of the fibers and forming a collection area for impurities together with an end wall of said removal opening, said conveyor belt extending along and serving as fiber guide surface for a substantial portion of the travel path of said fibers at said opening roll.

3,975,896

SWITCHING DEVICE FOR ELECTRONIC TIMEPIECE

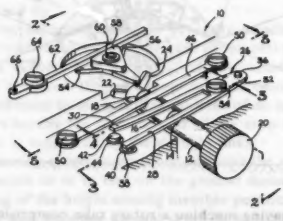
Noriyuki Kasama, Kodaira, Japan, assignor to Citizen Watch Co., Ltd., Tokyo, Japan

Filed Dec. 20, 1974, Ser. No. 534,839

Claims priority, application Japan, Dec. 24, 1973, 48-143578

Int. Cl.² G04C 3/00; H01H 19/00

U.S. Cl. 58—23 R 18 Claims



1. A switching mechanism for a timepiece having at least one electronic circuit and an internal switching assembly, said mechanism comprising:

a movable rod for selectively moving said internal switching assembly, said rod having an internal segment inside of said timepiece and an external segment outside of said

timepiece, said internal segment having at least two notches disposed along the length thereof, said external segment coupled to said internal segment such that when said external segment is moved, said internal segment is selectively moved into a plurality of predetermined positions;

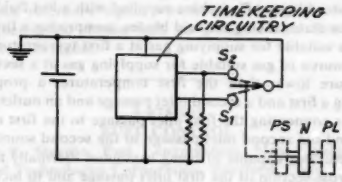
said internal switching assembly having two flexible arm members, each said arm member extending transversely across said internal segment and engaging said internal segment of said rod such that when said internal segment is moved from a first predetermined position to a second predetermined position, one of said arms is disposed into one of two said notches and the end of said arm engages one of a plurality of electrical contacts coupled to said circuit thereby activating said circuit.

3,975,897

ELECTRONIC DISPLAY DIGITAL WRISTWATCH

Okito Naito, Suwa, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Filed Jan. 30, 1975, Ser. No. 545,654
Claims priority, application Japan, Jan. 30, 1974, 49-12438
Int. Cl.² G04C 3/00; G04B 19/30
U.S. Cl. 58—23 R **13 Claims**



1. In an electronic wristwatch having divider means including a plurality of divider stages adapted to produce timekeeping signals in response to a high frequency time standard signal, and a plurality of display means adapted to receive said timekeeping signals and display time in response thereto, the improvement comprising correction means coupled to at least two of said respective plurality of divider stages, said correction means including a manually operated member displaceable in a first and second direction, each displacement of said member in a first direction sequentially selecting a different divider stage to be corrected, and displacement of said member in the other direction effecting correction of said divider stage last selected by each said first mentioned displacement.

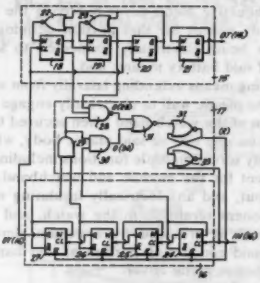
3,975,898

ELECTRONIC TIMEPIECE

Izuhiko Nishimura, Suwa, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Filed July 11, 1975, Ser. No. 595,262
Claims priority, application Japan, July 11, 1974, 49-79466
Int. Cl.² G04C 3/00
U.S. Cl. 58—23 R **19 Claims**

1. In an electronic timepiece including an oscillator means for producing a high frequency time standard signal having a frequency of K^NHz, where K and N are positive integers other than zero, and divider means adapted to evenly divide said high frequency time standard signal by K^M, where M is an integer other than zero, and produce a K^{N-M} frequency signal having a frequency not evenly divisible by I^P, where I is a positive integer other than K and P is an integer, counter means adapted to produce output signals representative of a counting cycle in response to an input pulse signal applied thereto, and display means coupled to said counter means for displaying each count of the cycle thereof, the improvement comprising detecting means for detecting at least one predetermined count of each counting cycle thereof, and in response to each predetermined count detected, producing a detection pulse, and variable divider means coupled to said detection means and having a first and second division ratio, said varible divider means being adapted to receive said



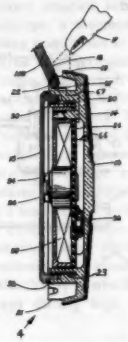
K^N⅛^M frequency signal and in response thereto divide same by a first division ratio and in response to each said detection pulse applied thereto said K^{N-M} frequency signal by said second division ratio, to thereby apply an input pulse signal to said counter means having a frequency evenly divisible by I^P.

3,975,899

MULTI-FUNCTION WATCH CASING

Terry M. Haber, 3050 S. Bristol, Apt. 8C, Santa Ana, Calif. 92707

Filed May 5, 1975, Ser. No. 574,518
Int. Cl.² G04B 37/00
U.S. Cl. 58—88 R **6 Claims**



1. A multi-function casing for a digital type read-out band supported wristwatch normally containing a module with digital read-out on its top surface, battery means having first and second contacts, a display illuminating switch, and a manually operable time setting switch with external button, comprising, in combination:

a. a molded transparent integral plastic body of electrical insulating material shaped to surround and position the upper portion of said module, the top central portion of said body defining a lens for said digital read-out, opposite side portions defining coupling ears for a wristwatch band, and one surrounding wall portion having at least one molded opening for accommodating portions of the time setting switch;

b. an annular metal base assembly having annular ring means, said plastic body having a bottom opening means receiving said annular ring means, said base assembly being in electrical communication with said first contact of said battery means, the second contact of the battery

means connecting to electrical terminals of said switches and module when positioned within said plastic body, the annular ring means of said base assembly providing a return current path from component terminals within said plastic body to said first contact of said battery means;

c. a thin conductive metal cover overlying the top of said plastic body except for that portion defining said lens, said cover being electrically connected to said second contact of said battery means; and,

d. a conducting means extending laterally from said module through the plastic wall to electrically engage a conducting portion of the watch band when secured to said coupling ears on one side of said plastic body, whereby said plastic body serves multiple functions including a support environment for the module and watchband, a lens for the read-out, and an electrically insulating medium for the component terminals in the watch, and whereby a touch switch is provided by a person simultaneously touching said conducting portion of said band and said thin conductive metal cover.

3,975,900

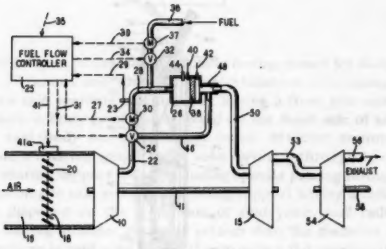
METHOD AND APPARATUS FOR TURBINE SYSTEM COMBUSTOR TEMPERATURE

William C. Pfefferle, Middletown, N.J., assignor to Engelhard Minerals & Chemicals Corporation, Murray Hill, N.J.

Continuation-in-part of Ser. No. 227,420, Feb. 18, 1972, abandoned. This application Oct. 30, 1974, Ser. No. 519,288

Int. Cl.² F02C 9/04, 9/14

U.S. Cl. 60—39.03 **21 Claims**



1. A method for operating a gas turbine by combusting a carbonaceous fuel over a period of operation of said turbine during which the fuel demand or the combustion air temperature varies, comprising:

a. forming an intimate admixture of said fuel and combustion air;

b. substantially simultaneously controlling the ratio of said fuel to said combustion air in said admixture to maintain the adiabatic flame temperature of said admixture at about a preselected value;

c. combusting at least a portion of the fuel in said admixture under essentially adiabatic conditions in a combustion zone, in the presence of a solid oxidation catalyst occupying a major portion of the flow cross section of said combustion zone, to form an effluent of high thermal energy; and

d. passing said effluent to a turbine to rotate said turbine.

3,975,901

DEVICE FOR REGULATING TURBINE BLADE TIP CLEARANCE

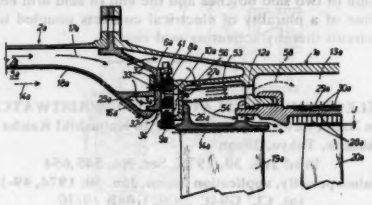
Claude Christian Hallinger, L'Hay-les-Roses, and Robert Kervistin, Melun, both of France, assignors to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation, Paris, France

Filed July 22, 1975, Ser. No. 598,113

Claims priority, application France, July 31, 1974, 74.27209

Int. Cl.² F02C 7/18

U.S. Cl. 60—39.14 **11 Claims**



1. A device for regulating the clearance between the tips of the rotor blades of a turbine supplied with a hot fluid and the turbine stator facing the said blades, comprising a first source of gas suitable for supplying gas at a first temperature, a second source of gas suitable for supplying gas at a second temperature lower than the first temperature, a proportioner having a first and a second inlet passage and an outlet passage, means connecting the first inlet passage to the first source of gas and the second inlet passage to the second source of gas, an obturator capable of being expanded thermally to reduce the cross-section of the first inlet passage and to increase the cross-section of the second inlet passage, means whereby a portion of the obturator is contacted by said hot fluid, and means connecting the outlet passage to the said wall to direct thereupon a flow of gas issuing from the said outlet passage.

3,975,902

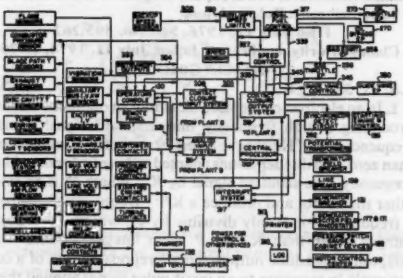
LOCAL MAINTENANCE CONTROLLER FOR GAS TURBINE POWER PLANTS HAVING A PRIMARY CONTROL SYSTEM

Jack R. Smith, Pittsburgh; Leonard H. Burrows, Gibsonia; Richard S. Heiser, Pittsburgh; Richard J. Hertz, Butler; Joseph A. Pesavento, Pittsburgh; John F. Reuther, Pittsburgh; James J. Shields, Philadelphia, and Robert A. Yannone, Aidan, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed June 4, 1974, Ser. No. 476,182

Int. Cl.² F02C 9/10, 9/02

U.S. Cl. 60—39.25 **5 Claims**



3. Control system apparatus for a gas turbine power plant, said control apparatus comprising:

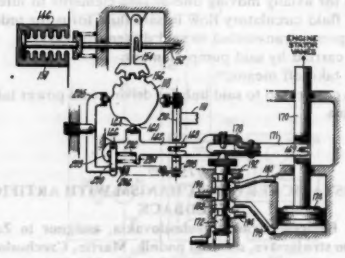
a. input means for receiving information from the plant including signals representative of turbine speed and temperature;
b. digital computer implemented means for generating a first speed reference signal;
c. circuit means for generating a second speed reference signal;
d. speed control means, operably coupled to said input means and to receive said first and second speed reference signals, for developing a speed error signal and for generating a fuel control signal as a function thereof;
e. means for generating a temperature reference signal;
f. temperature control means, operably coupled to said input means and to receive said temperature reference signal, for developing a temperature error signal and for generating a fuel control signal as a function thereof;
g. turbine fuel delivery means connected to said speed and temperature control means, for developing a fuel valve position demand signal as a function of a fuel control signal delivered thereto;
h. selection means, connected between said speed and temperature control means and said turbine fuel delivery means, for selecting one of said fuel control signals for use by said turbine fuel delivery means in accordance with a predetermined criteria; and
i. switching means for causing generation of said speed dependent fuel control signal as a function of said second speed reference signal whenever said digital computer implemented means fails to generate said first speed reference signal.

3,975,903

FUEL CONTROL

Charles F. Stearns, East Longmeadow, Mass., assignor to United Technologies Corporation, Hartford, Conn.

Filed Mar. 18, 1975, Ser. No. 559,458
Int. Cl.² F02C 9/10
U.S. Cl. 60—39.27 **8 Claims**



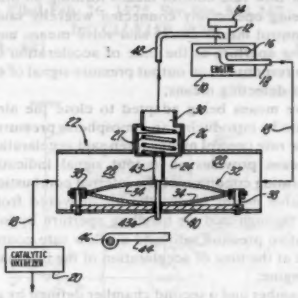
1. For a fuel control for a turbine type of power plant which fuel control provides a ratio signal of fuel flow to compressor pressure manifested as a function of engine operating parameters and multiplies said ratio by actual compressor pressure to control fuel flow and said fuel control controls the stator vanes of said power plant including a cam movable in a rotatable and axial direction as a function of said engine operating parameters, said cam having a profile providing the stator vane schedule, means operatively connected to said profile and stator vanes for positioning said stator vanes and additional means operatively connected to said profile for further adjusting fuel flow to provide the idle schedule of the fuel control.

3,975,904

CONTROLLED EXHAUST GAS RECIRCULATION

Frederick Julius Villforth, III, Fishkill, N.Y., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 22, 1975, Ser. No. 543,102
Int. Cl.² F02M 25/06; F02B 75/10
U.S. Cl. 60—278 **1 Claim**



1. In a power plant comprising an internal combustion engine having a combustion air intake, and an exhaust gas outlet line leading to a catalytic oxidizer which consumes objectionable impurities contained in the outlet stream when the outlet gases are at elevated temperatures: the improvement comprising a gas recirculation passage connecting the combustion air intake with a point in the exhaust gas outlet line upstream from the catalytic oxidizer; a valve movable between a first position substantially fully closing the recirculation passage and a second position substantially fully opening the recirculation passage; a thermostatic valve operator responding to temperature conditions in the exhaust gas line upstream from the catalytic oxidizer; said thermostatic operator having a disconnectable mechanical connection with the valve whereby the valve occupies its second position when the exhaust gas temperature is insufficient for effective oxidizer treatment by the catalytic oxidizer, and the valve occupies its first position when the exhaust gas temperature is high enough for treatment by the catalytic oxidizer; a second valve operator responsive to variations in fuel flow to the engine; said second operator having a lost motion connection to the aforementioned valve which enables the second operator to move the valve to its first position during high fuel flow operating periods; the above-mentioned lost motion connection being such that the valve is effectively controlled only by the thermostatic operator except during high fuel flow operating periods.

3,975,905

SECONDARY AIR FLOW RATE CONTROL DEVICE FOR USE IN EXHAUST GAS PURIFYING DEVICE

Shoji Shimo, and Takeshi Atago, both of Katsuta, Japan, assignors to Hitachi, Ltd., Japan

Filed Nov. 11, 1974, Ser. No. 522,923
Claims priority, application Japan, Nov. 14, 1973, 48-127317
Int. Cl.² F02B 75/10
U.S. Cl. 60—290 **5 Claims**

1. A secondary air flow rate control arrangement for use in an exhaust gas purifying device which includes an air pump for delivering secondary air through an air passage to an exhaust gas purifying device in an exhaust system for purifying unburnt components contained in exhaust gases from an internal combustion engine, an air bleeding aperture for bleeding air to the atmosphere, and a valve means provided in said aperture for controlling the amount of secondary air fed to the

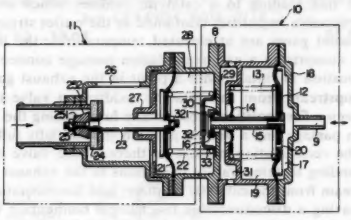
exhaust gas purifying device, the secondary air flow rate control arrangement comprising:

an air flow rate control means for controlling the position of said valve means;

an acceleration detecting means for detecting the acceleration condition of the internal combustion engine and providing an output pressure signal in accordance with a pressure prevailing in a suction pipe of the internal combustion engine, said acceleration detecting means and said air flow rate control means forming an integral unit and being operatively connected whereby said air flow rate control means closes said valve means and said air bleeding aperture at the time of acceleration of the engine in response to an output pressure signal of said acceleration detecting means;

said valve means being adapted to close the air bleeding aperture by introducing an atmospheric pressure into said air flow rate control means when said acceleration detecting means provides an output signal indicative of an accelerating condition of the internal combustion engine, said valve means bleeds the air delivered from the air pump through said air bleeding aperture by introducing a negative pressure into said air flow rate control means except at the time of acceleration of the internal combustion engine;

a first chamber and a second chamber defined by a partition wall in a cylindrical hollow body;



a first diaphragm provided within said first chamber, one side of said first diaphragm being in communication with a downstream side of a carburetor of the internal combustion engine;

a hollow rod secured to said first diaphragm on the other side thereof;

said valve means including a negative pressure valve provided at the tip of said hollow rod, said negative pressure valve being adapted to open and close said air bleeding aperture to the atmosphere;

said air bleeding aperture being provided in said partition wall and communicating said second chamber with the atmosphere;

said negative pressure valve being adapted to introduce atmospheric pressure into said second chamber when a negative pressure downstream of a throttle valve of the carburetor of the internal combustion engine is relatively low and to introduce a negative pressure through said hollow rod when the negative pressure downstream of the throttle valve is relatively high,

a second diaphragm provided in said second chamber, oen side of said second diaphragm being adapted to receive the negative pressure introduced through said hollow rod as well as the atmospheric pressure when said negative pressure is interrupted;

a rod secured to said second diaphragm on the other side thereof; and

a further valve means for bleeding or interrupting air delivered from said air pump to the atmosphere.

3,975,906

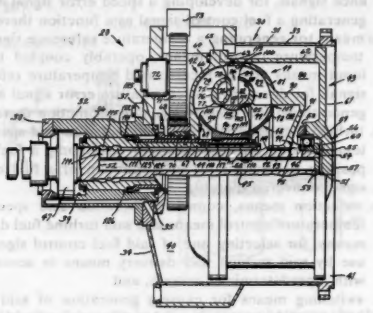
TWIN FLOW MODULATED TORQUE CONVERTER

Lyle E. Eaton, Pekin, and John H. Hyler, Peoria, both of Ill., assignors to Westinghouse Air Brake Company, Peoria, Ill.

Filed Mar. 3, 1975, Ser. No. 554,837

Int. Cl.[2] F16D *33/08*

U.S. Cl. 60—347 **16 Claims**



1. A torque converter comprising:

driven means;

drive means;

a source of fluid;

at least one pump element rotatable with said drive means;

at least one turbine element rotatable with said driven means;

at least one reactor element;

said pump, turbine and reactor element cooperating to define a fluid torus;

means supplying fluid from said source to said fluid torus;

said pump element developing fluid circulatory flow in said fluid torus to transmit power to said driven means;

means for axially moving one of said elements to interrupt said fluid circulatory flow in said fluid torus for reducing the power transmitted to said driven means;

a hub carried by said pump element;

power take off means;

means connected to said hub for driving said power take off means.

3,975,907

HYDROSTATIC SERVOMECHANISM WITH ARTIFICIAL FEEDBACK

Bohumil Polacek, Brno, Czechoslovakia, assignor to Zavody tazkeho strojarstva, narodni podnik, Martin, Czechoslovakia

Filed Oct. 15, 1974, Ser. No. 514,596

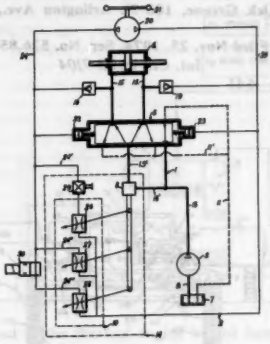
Claims priority, application Czechoslovakia, Oct. 16, 1973, 7093-73

Int. Cl.[2] F15B *15/18*

U.S. Cl. 60—386 **10 Claims**

1. In a hydrostatic servomechanism adapted for steering of vehicles and self-propelled machines, said servomechanism including a power circuit comprising at least one servopump, at least one servomotor, a distributor and connecting piping and a control circuit comprising a measuring pump actuated by a command element, the control circuit having control branches, reset mechanism for the distributor, the servomechanism being connected by the control branches to the reset mechanism of the distributor, the improvement which comprises at least one feedback simulator, the feedback simulator comprising a flow meter, and a controllable throttle means mechanically connected to the flow meter, said throttle means

controllable in steps being formed as a combination of several controllable individual throttle means which are mutually



connected and the feedback simulator being incorporated between the control branches of the control circuit.

3,975,908

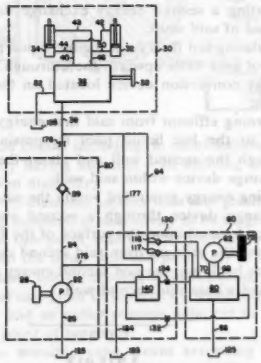
SYSTEM FOR PROVIDING AUXILIARY POWER

William E. Smith, Climax, and Charles J. Bowden, Galesburg, both of Mich., assignors to General Signal Corporation, Rochester, N.Y.

Continuation-in-part of Ser. No. 475,212, May 31, 1974, Pat. No. 3,896,618. This application July 21, 1975, Ser. No. 597,603

Int. Cl.[2] F15B *20/00*, *21/04*

U.S. Cl. 60—405 28 Claims



1. A system for providing auxiliary power which comprises:

a primary means including a primary pump, an output line to provide primary power to a work function means, and a return line;

an auxiliary means including an auxiliary pump, an output line to provide said auxiliary power, a return line and a valve means for controlling fluid flow in said output and return lines of said auxiliary means;

a reservoir connected to said primary return line and said auxiliary return line;

a control leakage means for cooling said auxiliary pump being connected to said auxiliary means, said reservoir and said primary means and being responsive to the output from said primary means for directing a portion of auxiliary output fluid to said reservoir when the primary means provides a predetermined output and directing a desired amount of said auxiliary output fluid to said auxiliary output line when said primary means provides less than said predetermined output.

3,975,909

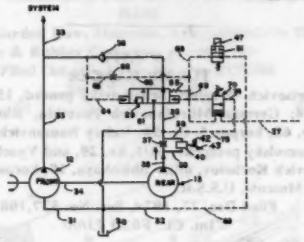
ENGINE SENSOR HYDRAULIC CONTROL SYSTEM

James R. McBurnett, Corinth, Miss., assignor to Tyrone Hydraulics, Inc., Corinth, Miss.

Filed Feb. 26, 1975, Ser. No. 553,242

Int. Cl.[2] F15B *18/00*

U.S. Cl. 60—421 12 Claims



1. In a hydraulic control system including hydraulically operated mechanism and a plurality of pump means driven by a prime mover, means for limiting the torque requirements imposed on said prime mover comprising means for unloading one of said pump means in response to a reduction of the speed of said prime mover below a predetermined value and for reloading said one pump means when the speed of the prime mover exceeds said predetermined value, and pressure responsive over ride means for permitting said reloading of said unloaded pump only when pressure in said system is below a predetermined pressure value and the speed of the prime mover is above a predetermined speed

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3,975,910

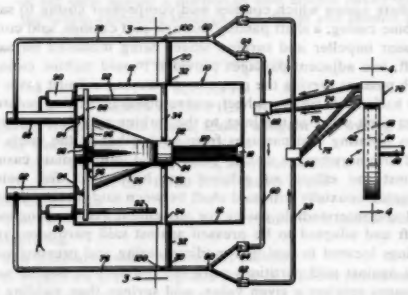
VARIABLE VOLUME LIQUID PUMPING SYSTEM

Benjamin F. Harvey, F-61 Country Corners, Athens, Ga. 30601

Division of Ser. No. 358,937, May 10, 1973, Pat. No. 3,892,072. This application Mar. 12, 1975, Ser. No. 557,871

Int. Cl.[2] F04D *49/00*

U.S. Cl. 60—487 3 Claims



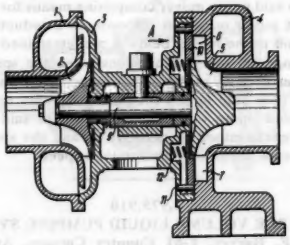
1. For use in connection with a closed liquid pressure system, a rotary input shaft, a cam body mounted on said shaft for rotation therewith and adjustable shifting therealong, said cam body including radially outwardly projecting and axially tapering cam means, liquid pump means including reciprocal piston means and back and forth shiftable actuator means

having a follower portion engaged with said cam body, said pump means including liquid inlet and outlet means, liquid conveyor means communicating with said liquid inlet and outlet means, closed variable volume liquid reservoir means communicated with said liquid conveying means and including shiftable operator means operative to vary the effective volume of said reservoir means, and motion transmitting means for operably connecting said shiftable operator means and said cam body for shifting the former in response to shifting of the latter to increase and decrease the effective volume of said liquid reservoir means for receiving and expelling liquid displaced from said outlet means and to be drawn into said inlet means, respectively, as a result of reciprocal shifting of said piston means upon back and forth shifting of said actuator means.

3,975,911
TURBOCHARGER

Jury Borisovich Morgulis, Schelkovsky proezd, 15, korpus 2, kv. 34; German Mitrofanovich Povetkin, Khoroshevskoe shosse, 68, korpus 5, kv. 54; Valery Naumovich Kaminsky, Komsomolsky prospekt, 14/1, kv. 29, and Vyacheslav Alexandrovich Kochetov, ulitsa Shirokaya, 19, korpus 2, kv. 14, all of Moscow, U.S.S.R.

Filed Dec. 27, 1974, Ser. No. 537,108
Int. Cl.² F02D *23/00*
U.S. Cl. 60—602 **3 Claims**

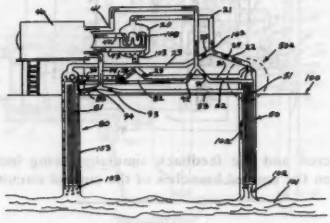


1. A turbocharger comprising: a compressor casing; a compressor impeller housed in said compressor casing; a turbine casing; a turbine wheel housed in said turbine casing; an intermediate casing which couples said compressor casing to said turbine casing; a shaft passing through said casings, said compressor impeller and turbine wheel being mounted on said shaft; two adjacent passages provided in said turbine casing, each passage serving the purpose of carrying exhaust gases to one half of said turbine wheel, and said passages being isolated from each other at the inlet to the turbine wheel; two partitions isolating said passages from each other at the inlets to said turbine wheel; a disk to protect said intermediate casing against the effects of exhaust gas heat, said disk being mounted coaxially with said shaft between said turbine casing and said intermediate casing for movement axially along said shaft and adapted to be pressed against said partitions; and springs located in said intermediate casing and pressing said disk against said partitions until the pressure in one of said passages reaches a given value, said springs then yielding to free said disk for movement axially along said shaft in opposition to said springs away from said partitions thus placing said passages in communication with each other for immediately lowering the pressure, whereby said disk not only acts to protect said intermediate casing against the effects of heat but also acts in cooperation with said springs to limit the pressure in said passages.

3,975,912
GEOTHERMAL DUAL ENERGY TRANSFER METHOD AND APPARATUS

Clarence Kirk Greene, 100 N. Arlington Ave., Reno, Nev. 89501

Filed Nov. 25, 1974, Ser. No. 526,856
Int. Cl.² F02G *7/04*
U.S. Cl. 60—641 **8 Claims**



1. The method of extracting energy from heated liquids beneath the surface of the Earth comprising the following steps:

1. providing at least two wells from the surface of the Earth intersecting a hot liquid pool beneath the surface of the Earth;
2. inserting a first energy exchange device within the first of said wells;
3. inserting a second energy exchange device within the second of said wells;
4. circulating hot fluid from the hot liquid pool through the first of said wells upward, therethrough, and into a first energy conversion device located on the surface of the Earth;
5. returning effluent from said first energy conversion device to the hot liquid pool by passing such effluent through the second well and about the second energy exchange device within said well;
6. passing energy generated within the said second energy exchange device through a second energy conversion device located upon the surface of the Earth;
7. passing the effluent from said second energy conversion device back into the said second energy exchange device located within said second well.

3,975,913
GAS GENERATOR AND ENHANCED ENERGY CONVERSION SYSTEMS

Donald C. Erickson, Annapolis, Md.

Filed Dec. 20, 1973, Ser. No. 426,524
Int. Cl.² F01K *21/00*, *27/00*
U.S. Cl. 60—645 **11 Claims**

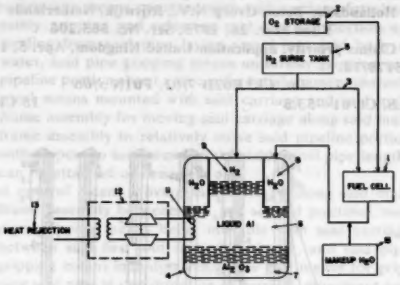
1. An energy conversion system comprised of:

hydrogen gas generator of the type in which a gas is produced by an exothermic chemical reaction between a gaseous substance and a liquid substance which is present in excess, and in which heat exchange means is incorporated;

a conduit to remove the gas produced in the gas generator;

a fuel cell which receives the gas produced by the gas generator through the conduit and uses that gas as one of its reactants;

a thermal engine which is powered by the heat from the exothermic reaction in the gas generator, the heat being



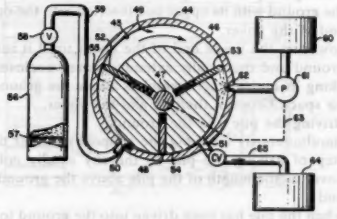
transferred to the thermal engine by the heat exchange means.

3,975,914

IMPLOSION ENGINE

Robert J. Tufts, P.O. Box 3088, and Albert S. Christopher, 4667 Telegraph Road, both of Ventura, Calif. 93003

Filed Nov. 15, 1974, Ser. No. 524,078
Int. Cl.[2] F01K *25/10, 25/06*
U.S. Cl. 60—673 2 Claims



1. An implosion engine including, in combination:

a. a stator body having an inner wall defining an annular cavity of given diameter;

b. a rotor body of diameter smaller than said given diameter eccentrically mounted in said cavity to be tangent to said inner wall at one point whereby a closed volume is defined between the inner wall and periphery of said rotor body, said stator body including an inlet passage adjacent to one side of said point of tangency communicating with said volume and an outlet passage adjacent to the other side of said point of tangency;

c. at least one movable vane means extending from the periphery of said rotor to said inner wall to define a closed volume between one side of said vane means and said point of tangency;

d. a closed gas system including a gas container holding a given gas under 2 to 20 atmospheres pressure connected to said inlet passage;

e. a liquid container holding a given liquid for which said gas has a chemical affinity;

f. pump means connected to said liquid container and to said stator body for introducing, upon actuation, a spray mist of liquid into the volume defined between the opposite side of said vane means and said point of tangency;

g. means responsive to rotation of said rotor to a given position for actuating said pump means; and,

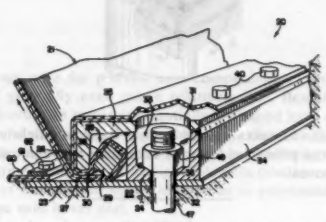
h. a closed exhaust container connected to said outlet passage whereby said rotor is caused to rotate by gas under pressure passing into said inlet passage and acting against said one side of said vane means, the gas subsequently being subjected to a spray mist of said liquid when said rotor reaches said given position for actuating said pump means, said spray mist of liquid absorbing said gas to thereby create a vacuum in the volume defined between said other side of said vane means and said point of tangency thereby increasing the pressure differential across said vane means to cause continuous rotation of said rotor, water resulting from said mist with said absorbed gas therein being exhausted through said outlet passage to said exhaust container.

3,975,915

ANCHOR ASSEMBLY FOR AN INFLATABLE FABRIC DAM

Sherwood Gordon Haw, Magnolia, Ark., assignor to The Firestone Tire & Rubber Company, Akron, Ohio

Filed Oct. 23, 1974, Ser. No. 517,269
Int. Cl.[2] E02B *7/02*
U.S. Cl. 61—30 6 Claims



1. An assembly for anchoring an inflatable fabric dam on a foundation comprising:

a substantially horizontal base plate on the foundation,

buttress means projecting upwardly of said base plate,

a substantially horizontal bridge plate supported on said buttress means,

a substantially vertical flange extending from said bridge plate and terminating a predetermined distance above said base plate and forming therewith a throat,

said base plate, buttress, bridge plate and flange defining a four-sided, substantially rectangular anchor cavity, and

anchor means of parallelogram cross-section and of a size to maintain it captive within said four-sided anchor cavity,

said anchor means rotatable to clamp a portion of the fabric of the dam against a portion of said anchor cavity when the fabric extending through said throat and around said anchor means is tensioned.

3,975,916

LAMINATED PIER BUMPER

Bert E. Watson, Santa Clara, Calif., assignor to Pawling Rubber Corporation, Pawling, N.Y.

Filed Mar. 14, 1975, Ser. No. 558,218
Int. Cl.[2] E02B *3/22*; B63B *21/00*
U.S. Cl. 61—48 4 Claims

1. A pier bumper assembly for reception on a marine piling, comprising

a. a laminated stack of resilient plates,

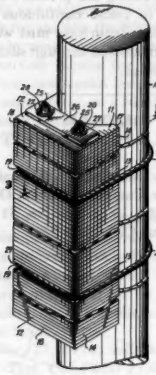
b. means for maintaining said stack of resilient plates under compression,

c. selected ones of said resilient plates having a lesser front-to-back depth than others to form spaced grooves in the front face of said bumper assembly for the reception of securing cables,

d. the side, front and back edges of the remaining ones of said plates being substantially aligned to define the side, front and back faces of said bumper assembly,

e. the back face of said assembly having an arcuate contour with a depth of more than half its radius,

f. said radius conforming generally to that of the piling receiving said assembly, and



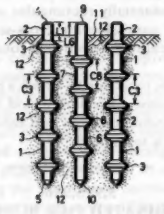
g. means for securing said bumper back face tightly to a face of the piling, said means extending through said spaced grooves.

3,975,917

FLANGED FOUNDATION PILE GROUP AND METHOD OF CONSTRUCTING A FOUNDATION BY MEANS OF THE SAME

Kingo Asayama, 9-1, 3-chome, Kourigaoka, Hirakata, Osaka, Japan

Filed Aug. 22, 1974, Ser. No. 499,784
Int. Cl.² E02D 5/30
U.S. Cl. 61—53 2 Claims



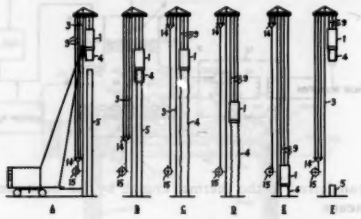
1. A foundation comprising a first plurality of driven columnar piles having a plurality of equally spaced circumferential flanges of greater diameter than and encircling said piles, said flanges being separated by columnar shank portions; a second plurality of driven columnar piles also having a plurality of equally spaced circumferential flanges of greater diameter than and encircling said piles, said flanges also being separated by columnar shank portions; said flanges of said first and second piles being embedded in the earth; said flanges of said first piles being vertically staggered with respect to and intermediate the flanges of said second plurality of piles with each of the flanges of said first piles being in the same horizontal plane as a shank portion of said second piles, the spacing of said piles being such that the soil intermediate the piles is generally uniformly compacted by the piles.

3,975,918

PILEDRIVING

Joost Werner Jansz, The Hague, Netherlands, assignor to Hollandsche Beton Groep N.V., Rijswijk, Netherlands

Filed Mar. 28, 1975, Ser. No. 563,206
Claims priority, application United Kingdom, Apr. 5, 1974. 15179/74
Int. Cl.² E02D 7/02; F01N 3/06
U.S. Cl. 61—53.5 15 Claims



1. A method of driving a pile into the ground with reduced noise radiation from the pile, comprising the steps of:

a. providing an axially collapsible tubular cover of flexible material attached at one end to a support member selected from a hammer driving unit and a pile cap,

b. raising the support member to an elevated position with the cover suspended therefrom retained in a substantially collapsed retracted condition,

c. placing the pile in the position where it is to be driven into the ground with its upper end inserted into the open lower end of the cover,

d. lowering the lower end of the cover until it reaches the ground and the axially extended cover encloses the pile along its entire length which is above the ground with an air space between the pile and the cover,

e. driving the pile into the ground,

f. simultaneously lowering the support member during the step of driving the pile to thereby axially collapse the cover as the length of the pile above the ground reduces, and

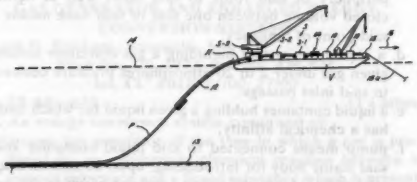
g. when the pile has been driven into the ground to a desired depth, lifting the support member and the at least partially collapsed tubular cover from the top of the pile.

3,975,919

PIPELINE POSITIONING SYSTEM

Harry W. Harrison, Rte. 1, Box 99, Dripping Springs, Tex. 78620

Continuation of Ser. No. 514,435, Oct. 15, 1974, abandoned. This application June 23, 1975, Ser. No. 589,441
Int. Cl.² F16L 1/00
U.S. Cl. 61—108 19 Claims



1. A pipeline positioner system for maintaining control of a pipeline portion extending from a pipe laying vessel into a body of water, wherein said system includes one or more pipe control stations for mounting on said vessel, which stations comprise:

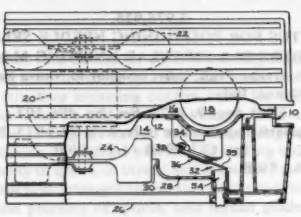
a main frame assembly for mounting on a pipe laying vessel;
a carriage and means mounting said carriage with said main frame assembly for movement with respect thereto;
pipe gripping means mounted with said carriage for alternately gripping and releasing said pipeline portion extending from said pipe laying vessel into said body of water, said pipe gripping means uniformly gripping said pipeline portion about a circumferential segment thereof;
control means mounted with said carriage and said main frame assembly for moving said carriage along said main frame assembly to relatively move said pipeline portion with respect to said vessel so that additional pipe lengths can be attached or removed; and
said control means moving said carriage along said main frame assembly between first and second positions, said pipe gripping means being movable with said carriage between said first and second positions, and said pipe gripping means including releasable grip means for gripping said pipe in one direction of carriage movement and for releasing said pipe for carriage movement in the other direction.

3,975,920

AIR CONDITIONER DAMPER CONTROL

Michael J. McCauley, and Richard L. Shaner, both of Louisville, Ky., assignors to General Electric Company, Louisville, Ky.

Filed Oct. 6, 1975, Ser. No. 619,695
Int. Cl.² F25D *23/12*
U.S. Cl. 62—262 **4 Claims**



1. In an air conditioning unit, including a base structure divided by a barrier into inner and outer sections, frame means removably arranged on said base structure including a front wall being spaced from said barrier defining an inner compartment, and air means arranged in an opening in said front wall for moving air through said compartment comprising:
an aperture in said barrier for permitting the flow of air from one compartment to the other;
air valving means hingedly mounted on said barrier so that it is positioned across said aperture;
resilient means for continually biasing said air valving means in a closed position across said aperture;
a guide member arranged in the front wall of said frame means including a passageway being axially aligned with at least a portion of said damper when said frame means is arranged on said base structure;
an actuating member slidably arranged in said passageway having one end extending into said inner compartment being operably associated with said air valving means for pivoting said air valving means to an open position when said actuating member is moved axially toward said air valving means and for retracting said actuating member relative to said passageway under influence of said resilient means when said air valving means is in its closed position;
latch means on one of said members arranged to engage holding means on the other of said members when said air valving means is in its open position for removably securing said actuating member relative to said passageway to maintain said air valving means in its open position against action of said biasing means.

3,975,921

EAR WIRE CONSTRUCTION

Charles J. Pomaski, 179 Kenyon Ave., East Greenwich, R.I. 02818

Filed May 27, 1975, Ser. No. 580,935
Int. Cl.² A44C *7/00*
U.S. Cl. 63—13 **11 Claims**

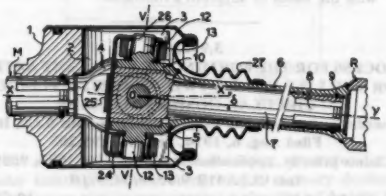
1. An ear wire for pierced ears comprising, a continuous length of generally even gauge relatively stiff, flexible, wire material having an upper substantially U-shaped loop open at its lower end and a closed lower loop of smaller size than said upper loop and of a continuously curved substantially circular configuration exhibiting no straight sidewalls positioned in the open lower end of said upper loop so as to substantially entirely close said lower end,
said upper loop having an ear lobe contacting central cradle portion for supporting said ear wire in hanging relation from said ear lobe, one side portion of said upper loop terminating in a relatively straight free end for initial insertion through a pierced ear lobe opening and the other side portion thereof terminating in a portion of said lower loop,
said lower loop having a lowermost cradle portion for support of an ornament and an uppermost portion in opposition to such cradle portion and terminating in a free end.

3,975,922

HOMOKINETIC TRANSMISSION JOINT

Michel Orain, Conflans-Sainte-Honorine, France, assignor to Glaenzer Spicer, Poissy, France

Filed May 6, 1975, Ser. No. 574,937
Claims priority, application France, May 13, 1974, 74.16472
Int. Cl.² F16D *3/30*
U.S. Cl. 64—21 **28 Claims**



1. A homokinetic transmission joint comprising a first element for connection to one of two shafts to be interconnected, a second element for connection to the other of said two shafts, the first element defining *n* pairs of raceways, *n* being an even whole number equal to at least 4, the pairs of raceways being disposed symmetrically 2 by 2 with respect to the

axis of rotation of the first element and being angularly evenly spaced apart in a plane perpendicular to said axis, said second element comprising $n/2$ concentric shaft sections, each shaft section having a capacity to undergo an elastic deformation in torsion, each of said $n/2$ shaft sections carrying two trunnions, and rollers which are respectively rotatably mounted on the trunnions and are in contact with the respective pairs of raceways, whereby when the joint rotates at an angle the difference in phase between the pairs of rollers is absorbed by the torsion of the concentric shaft sections.

3,975,923

OVERLOAD CONTROL COUPLING BETWEEN TWO ROTATING MACHINE ELEMENTS

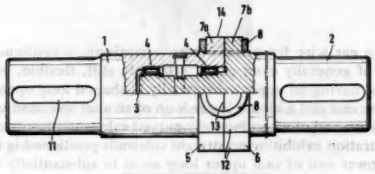
Karl Grimpe, Mulheim (Puhr), Germany, assignor to Demag Aktiengesellschaft, Germany

Filed June 23, 1975, Ser. No. 589,547

Claims priority, application Germany, June 26, 1974, 2430541

Int. Cl.² F16D 3/56

U.S. Cl. 64—28 R **7 Claims**



1. An overload control coupling between two rotating machine elements having at least two generally semi-cylindrical extensions radially arranged at each of the machine elements and uniformly distributed over the circumference thereof; and extensions cooperating to form cylinders having separating planes parallel with the rotation of the machine elements; the cylinders being embraced by annular power-transmitting carrier links which thereby connect the two machine elements and which links, in the event of their failure due to an overload of the coupling, separate the connection, characterized in that

a. said carrier links comprise rings made of strong, rigid material;

b. said rings embrace said extensions under an intitial stress;

c. a plurality of camming scrapers are formed on said elements and are arranged between said extensions in a peripheral direction;

d. the radial extent of said scrapers equal at least that of the extensions; and

e. said scrapers having scraper planes parallel with the shaft axis of said elements and forming an angle of at least 90° with the bases of adjacent extensions.

3,975,924

PROCESS FOR THE FORMING OF A COLLANT ARTICLE OR THE LIKE WITH A TWO OPPOSITE CYLINDERS CIRCULAR HOSIERY MACHINE

Edoardo Furia, Florence, Italy, assignor to Solis S.r.l., Italy

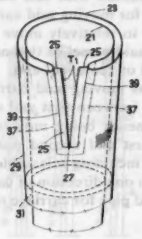
Filed Aug. 6, 1974, Ser. No. 495,203

Claims priority, application Italy, Aug. 10, 1973, 9589/73

Int. Cl.² A41B 9/02, 9/04, 9/10

U.S. Cl. 66—14 **10 Claims**

1. In a process for the production of a collant, panty-hose article, or the like using a circular hosiery machine having concentric first and second cylinders, by forming each leg on a respective one of the two cylinders in a simultaneous manner with a continuous rotational motion and forming the pant portion by forming a fabric alternately on the two cylinders, the steps of: forming the pant portion with a continuous rotational motion of the two cylinders, during such continuous rotational motion of the two cylinders, in a first step, forming at least one course with the needles of the first cylinder; in a second step, passing the yarn from the needles of the first cylinder to the needles of the second cylinder at a first position; in a third step, forming at least one complete course on the needles of the second cylinder; in a fourth step, passing the



yarn from the needles of the second cylinder to those of the first cylinder at a second position spaced angularly from the first position; then repeating said four steps; whereby the respective tubular fabrics formed by the two cylinders are bound to each other at least at said two positions, and a fabric portion extends between said two positions; and effecting a longitudinal cutting of the fabric portion extending between said two positions.

3,975,925

APPARATUS FOR POSITIONING NEEDLE SELECTING CYLINDERS IN A CIRCULAR KNITTING MACHINE

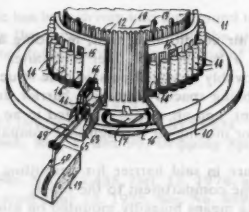
Mario Piro, Genoa-Pegli, Italy, assignor to Nuova San Giorgio S.p.A., Genoa, Italy

Filed Aug. 9, 1974, Ser. No. 496,103

Claims priority, application Italy, Aug. 30, 1973, 28364/73

Int. Cl.² D04B 15/74, 9/00

U.S. Cl. 66—50 B **7 Claims**



1. A circular knitting machine comprising a needle cylinder rotatably carried by a stationary structure or frame of the machine, and a plurality of needle selecting cylinders arranged about the periphery of said needle cylinder, said needle selecting cylinders being controlled to rotate by a cam carried by the needle cylinder for controlling the extent of rotation of each needle selecting cylinder, a cam positioning device comprising a portion connected to said frame and a portion movable with said needle cylinder; said movable portion comprising a support for the cam movable between extreme positions and cooperating with a retaining means including means cooperable with said portion connected to the frame to release and block the cam, and maintaining it at predetermined positions between said extreme positions, said stationary portion of the device including a release member acting on said retaining means to release said retaining means from the cam, and positioning members angularly spaced apart forwardly of the release member and acting against a return spring to position

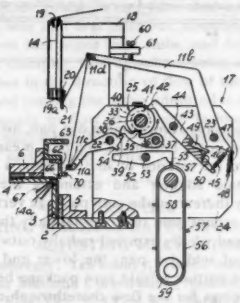
the cam at said predetermined positions, said release and positioning members being operated through control linkages by a common single programming device, said movable portion of the device including a cam thrust surface, inclined to a radial direction, against which said positioning members are operative.

3,975,926

FEED DEVICE FOR CIRCULAR KNITTING MACHINES OF THE TYPE MANUFACTURING OPEN FABRIC

Riccardo Tenconi, Via Tallera, 20, Varese, Italy

Filed Feb. 24, 1975, Ser. No. 552,492
Int. Cl.² D04B 15/58
U.S. Cl. 66—133 **10 Claims**



1. A thread feed device for circular knitting machines of the type having a fixed needle cylinder and needle dial, a rotating machine structure including control cams for the needles, a needle-free zone on said needle cylinder and needle dial and a device for cutting the thread at the beginning of said zone, the feed device including a plurality of feeding units comprising a plurality of spools of thread and respective thread guides, a fixed structure arranged to the side of the machine for supporting said plurality of spools, said thread guides being arranged in the proximity of the needle cylinder at said needle-free zone and selectively approachable to said cylinder to selectively feed the needles with a thread previously cut by said cutting device, the device further including guide means arranged on said rotating machine structure for taking the thread fed by said selected thread guides and for feeding said thread to the needles around the needle cylinder.

3,975,927

STRIPING APPARATUS FOR CIRCULAR KNITTING MACHINES

Karl Mickeler, Rottenburg, and Moritz Schall, Wurmlingen, both of Germany, assignors to Firma Fouquet-Werke Frauz & Planck, Rottenburg, Germany

Continuation-in-part of Ser. No. 141,278, May 7, 1971. This application Jan. 30, 1974, Ser. No. 437,893
Claims priority, application Germany, May 19, 1970, 2024241
Int. Cl.² D04B 15/60
U.S. Cl. 66—134 **15 Claims**

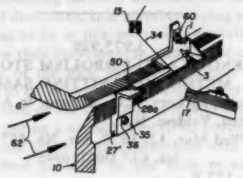
1. In a circular knitting machine having

a dial needle bed (6) and a cylinder needle bed (10), dial needles (4) and cylinder needles (9) in said respective needle beds, and means projecting the respective needles in accordance with predetermined contours;

striping apparatus including a plurality of thread guiding eyes (13) and means (14, 15) mounting said eyes on the machine for movement between a rest position and a working position, individual threads (34*a*–34*d*) being guided to the thread guide means by the eyes (13);

thread guide means (1) fixed on the machine and formed with a thread insertion slot (3);

and a unitary thread entrainment element (27, 27*a*) located below the thread guide means (1), fixedly secured to one of said beds and travelling circumferentially of the machine synchronously with the progression of movement (20, 21) of the needles between withdrawn and knitting positions, to entrain and insert into the thread insertion slot (3) of the thread guide means one or more threads (34*a*–*d*) supplied by those thread guide eyes (13) which are in working position;



said thread entrainment element comprising

a thread entrainment segment (28, 28*a*) radially projecting under the thread guide means (1), said segment being formed with an inwardly directed inclined forward guide surface (29, 29*a*) to form a nip (30) with the respective one of said beds which, upon rotation of said respective bed, comes into alignment with said thread insertion slot,

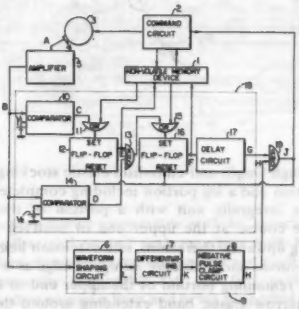
the thread entrainment segment (28) being located on the respective bed and extending to the region adjacent to the respective needle contour of the other respective bed, to which it is secured.

3,975,928

SYNCHRONIZING SIGNAL DETECTING APPARATUS FOR CIRCULAR KNITTING MACHINES

Nokihisa Adachi, Kasugai, and Tetuzo Oda, Kagamigahara, both of Japan, assignors to Okuma Machinery Works, Ltd., Japan

Filed Sept. 3, 1975, Ser. No. 610,085
Int. Cl.² D04B 15/16
U.S. Cl. 66—154 A **3 Claims**



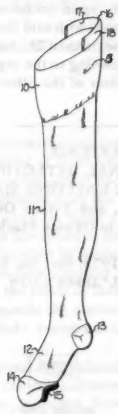
1. In a synchronizing signal detecting apparatus for the circular knitting machine comprising a memory device for storing pattern signals representing a plurality of desired knitting patterns, a command circuit for processing a pattern signal associated with the current knitting operation among said pattern signals stored in said memory device, a needle track detector for producing a sine-wave signal associated with the movement of a needle track, a synchronizing signal detector for producing a synchronizing signal at the time point when said sine-wave signal crosses the zero level, and a nee-

dle-selecting system disposed in opposition to each yarn feeder on the periphery of the cylinder of said circular knitting machine, said pattern signal associated with the current knitting operation being processed in synchronism with the knitting speed of said circular knitting machine, said needle-selecting system being impressed with said pattern signal processed as above, thus performing a pattern knitting operation; the improvement further comprising means for ascertaining that said sine-wave signal has passed a predetermined valve before crossing the zero level, said synchronizing signal being made effective when said ascertaining means produces an ascertained signal.

3,975,929
THIGH LENGTH ANTI-EMBOLISM STOCKING AND METHOD OF KNITTING SAME

Oscar Fregeolle, Hickory, N.C., assignor to Alba-Waldensian, Incorporated, Valdese, N.C.

Filed Mar. 12, 1975, Ser. No. 557,603
Int. Cl.² D04B 9/46
U.S. Cl. 66—172 E **11 Claims**

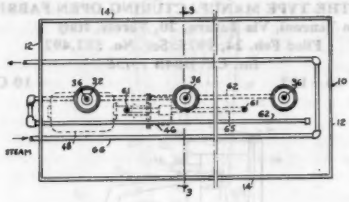


1. A thigh length anti-embolism elastic stocking including a foot portion and a leg portion including complete courses, an extension integrally knit with a portion of the uppermost complete course at the upper end of said leg portion and extending upwardly therefrom, said extension being formed of partial courses and including an upper edge at a higher level than the remaining portion of the upper end of said leg portion, a narrow elastic band extending around the remaining portion of the upper end of said leg portion and from one side of said extension to the other, said elastic band including opposite ends, seam means connecting said opposite ends of said elastic band to opposite sides of sa d extension, said elastic band including upper and lower edges, and seam means connecting said lower edge of said elastic band to the remaining portion of the uppermost complete course at the upper end of said leg so that said elastic band extends upwardly above the upper end of said leg and with said upper edge of said elastic band being aligned with the upper edge of said integrally knit extension.

3,975,930
APPARATUS FOR DYING YARN

Leslie E. Lunsford, 1216 Laurelwood Drive, Chattanooga, Tenn. 37412, and Clyde A. Simmons, Rte. No. 5, Calhoun, Ga. 30701

Filed Aug. 10, 1973, Ser. No. 387,493
Int. Cl.² D06B 5/18
U.S. Cl. 68—189 **6 Claims**

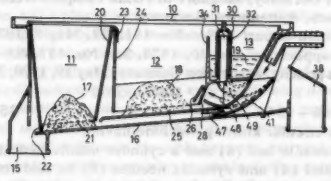


1. Dyeing apparatus comprising a dye pan, an open-topped adapter arranged in the bottom of said pan, means for supplying liquid dye to the interior of said adapter, a vertical tube supported by said adapter and extending thereabove and adapted to carry therearound a yarn package vertically wound back and forth around said tube substantially throughout the height thereof and wholly exposed radially outwardly thereof to the interior of said dye pan, the lower end of said tube within the lower portion of said yarn package being provided with radial openings for the flow therethrough of dye liquor, a seal closing said tube at a point substantially above the uppermost of said radial openings, said tube between the uppermost of said radial openings and said seal being imperforate to trap air in said tube and thereby limit upward flow of dye in said tube to a level slightly above the level of the uppermost radial openings whereby the flow of dye radially outwardly through the package will take place only through that portion of the package surrounding said radial openings to thereby dye said portion, and to leave the portion of said package surrounding the imperforate portion of said tube undyed.

3,975,931
FLUSH-IN DEVICE FOR AN APPLIANCE SUCH AS A LAUNDRY OR DISHWASHING MACHINE

Hermann Bischkopf, Berlin, Germany, assignor to Siemens Electrogerate GmbH, Munich, Germany

Continuation of Ser. No. 407,152, Oct. 17, 1973, abandoned. This application Apr. 14, 1975, Ser. No. 567,943
Claims priority, application Germany, Oct. 26, 1972, 2253094
Int. Cl.² D06F 39/02
U.S. Cl. 68—17 R **3 Claims**



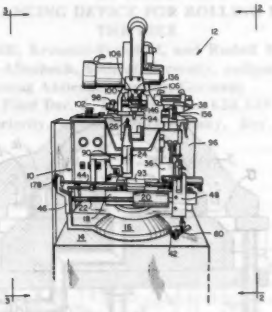
1. In a laundry or dish washing machine, including a vessel for washing and a flush-in device for washing and cleansing agents, said device having a plurality of water inlet stubs for admitting water to said device, a plurality of chambers disposed one adjacent the other for receiving different ones of said agents therein, and an outlet structure common to all of

said chambers and leading to said vessel, the improvement comprising said chambers comprising a unitary structure, with said water inlet stubs and said outlet structure being disposed at opposite ends of said device, and a single component part water guide comprising a plurality of channel-like water ducts for guiding water from respective ones of said inlet stubs to corresponding ones of said chambers, a first one of said chambers including a syphon coupled to one of said water ducts for admitting water thereinto for containing a liquid cleansing agent, a second one of said chambers being disposed adjacent said first chamber and coupled directly to another one of said water ducts for containing a main washing agent, and a third one of said chambers being disposed adjacent said second chamber for containing a soaking agent and being coupled directly to a third one of said water ducts into which water duct an outlet opens from said second chamber, said ducts of said water guide guiding water from said inlet stubs through said syphon into said first chamber, directly into said second chamber from said water inlet stubs, and from said outlet of said second chamber, said chambers being arranged one behind the other in the direction of flow of the water from said inlet stubs and causing the water admitted to said chambers by said water guide to flow in cascade fashion from said first chamber to said third chamber and into said common outlet structure of said flush-in device.

3,975,932
ROUGHING MACHINE HAVING TOOL POSITION ADJUSTING MECHANISM

Walter Vornberger, Tewksbury, Mass., assignor to International Shoe Machine Corporation, Nashua, N.H.

Filed Oct. 9, 1975, Ser. No. 621,188
Int. Cl.² C14B *1/44*; A43D *95/00*
U.S. Cl. 69—6.5 **7 Claims**

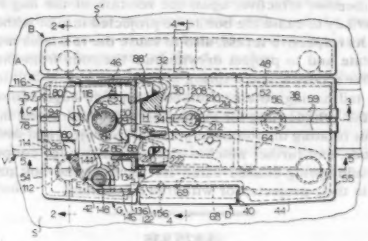


1. A machine for roughing the margin of an upper of a shoe assembly, said shoe assembly comprising a last having an insole located on its bottom and the upper mounted thereon with the upper margin lying against and being secured to the insole periphery, comprising: a housing; a roughing tool mounted to the housing for forward-rearward movement; drive means for moving the roughing tool between forward and rearward positions with respect to the housing; a turntable mounted for rotary movement about an upright axis; a slide mounted to the turntable for reciprocal movement in two opposite prone directions between two end positions on the turntable; a shoe assembly support mounted to the slide for supporting the shoe assembly bottom-up; means for first moving the slide with respect to the turntable, while the turntable is stationary, in a first of said directions between said end positions so as to move a first side portion of the upper margin past the roughing tool; means for thereafter rotating the turntable 180° while the slide is stationary relative to the turntable to move an end portion of the upper margin past the roughing tool; means for thereafter moving the slide with respect to the turntable, while the turntable is stationary, in the other of said directions between said end positions to move the second side portion of the upper margin past the roughing tool; operating means effective during said movements of said upper margin portions past the roughing tool to cause such movements of the housing as to enable the roughing tool to engage the upper margin a relatively great distance inwardly of the periphery of the shoe assembly bottom when the roughing tool is in said forward position and to enable the roughing tool to engage the upper margin a relatively small distance inwardly of the periphery of the shoe assembly bottom when the roughing tool is in said rearward position; a control member mounted to the turntable; an actuating member mounted for movement with the slide in said directions; said members being so constructed and arranged as to be in non-intersecting relationship at the beginning of the slide movement in said first of said directions and at the end of the slide movement in said other of said directions and to be in intersecting relationship during a first prescribed portion of the slide movement in said first of said directions and during a second prescribed portion of the slide movement in said other of said directions with said first and second prescribed portions of the slide movements being laterally offset from each other; and adjusting means so connecting said members to the drive means as to cause the drive means to place the roughing tool in one of said positions when said members are in non-intersecting relationship and to place the roughing tool in the other of said positions when said members are in intersecting relationship.

3,975,933
LATCHING DEVICE

Lazlo Bako, Woodcliff Lake, N.J., assignor to Presto Lock Company, Division of Walter Kidde & Company, Inc., Elmwood Park, N.J.

Filed Jan. 23, 1975, Ser. No. 543,648
Int. Cl.² E05B *65/52*
U.S. Cl. 70—70 **10 Claims**

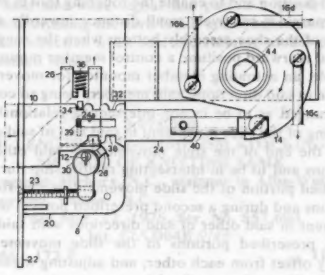


1. A latching device cooperable with an associated hasp, comprising first and second push members both having flat plate portions disposed in the same plane and each having an exposed manually engageable tab, the first push member being formed to engage a hasp and being supported for sliding movement in a substantially linear path to latching and unlatching positions with the plate portion thereof being movable in said plane, the second push member being supported for pivotal movement to hold and release positions with the plate portion thereof being movable in said plane, the plate portions of the push members providing cooperable means in said plane for preventing movement of the first push member from latching position when the second push member is in the hold position and for enabling the first push member to be moved to unlatching position when the second push member is pushed into the release position.

3,975,934
KEY-OPERATED DOOR LOCKING DEVICE

David Babai, 23 Ein Hakoreh St., Rishon Lezion, and Joseph Shabtai, 41 Guilim St., Holon, both of Israel

Filed Mar. 20, 1975, Ser. No. 560,115
Int. Cl.² E05B 63/14, 65/44
U.S. Cl. 70—120 10 Claims



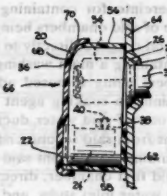
1. A key-operated door locking device including a lock casing mountable adjacent to one side of a door and having a keyhole for the insertion of a key; a cylinder within the casing and rotatable by the proper key when inserted into the keyhole and rotated therein; a dog carried by the cylinder and rotatable therewith; a bolt engageable by the dog and adapted to be projected and withdrawn with respect to the casing into and out of a recess in the door frame at said one side of the door; a rotatable member rotatably mounted on an axis substantially parallel to the axis of the keyhole; at least two rods each pivotably mounted at one end to a different eccentric point on the rotatable member and extending to the upper and lower edges of the door so as to be projected into further recesses in the door frame upon the rotation of the rotatable member in one direction, and to be withdrawn therefrom upon the rotation of the rotatable member in the opposite direction; a coupling between the cylinder dog and the rotatable member effective, upon the rotation of the dog by the proper key to cause the bolt to be projected into or withdrawn from its respective recess, also to cause the rotatable member to rotate and to project or withdraw the rods from their respective recesses; and a spring-biassed catch; said bolt including a tail having notches formed along one edge cooperable with the cylinder dog for projecting and withdrawing the bolt and for rotating the rotatable member to project and withdraw the rods, and further notches along another edge cooperable with said spring-biassed catch for securing the bolt and the rods in their projected or withdrawn positions.

3,975,935
REMOVABLE CASE FOR LUG LOCKING DEVICE AND ASSEMBLY THEREOF

James A. Masterson, 3635 Monogram, Long Beach, Calif. 90808

Filed Jan. 2, 1975, Ser. No. 537,970
Int. Cl.² E05B 17/18
U.S. Cl. 70—232 23 Claims

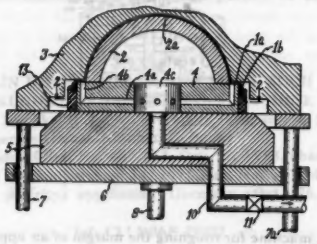
1. A removable protective case for use with a lug locking device of the type where a bolt-type lug secures a pair of members in locking relationship, and which case is sized and shaped to protect said locking device from adverse external conditions, and wherein said locking device includes a central body portion with a body continuous side wall and a body top wall extending across said body continuous side wall to receive a bolt-type lug and an enlarged boss having a surface for key operated lock access on said locking device; said case comprising a plastic member having a case side wall essentially conforming to the shape of and enclosing said central body portion and a case top wall extending across a portion of said case side wall and being in enclosing relationship therewith and conforming to an additional surface area of said bolt-type lug locking device, and an enlarged pocket on the case top wall of said case sized and located to accommodate said enlarged boss having said surface for key operated lock access.



3,975,936
FORMING APPARATUS

Frederick M. Baldwin, Asheville, and Stanley J. Noesen, Hendersonville, both of N.C., assignors to General Electric Company, New York, N.Y.

Filed June 19, 1975, Ser. No. 588,403
Int. Cl.² B21B 9/00
U.S. Cl. 72—38 4 Claims



1. Forming apparatus comprising, in combination, forming means comprising a convex forming punch having a base on the bottom thereof, annular wall means extending around said base and offset laterally beyond the bottom of said forming punch, said forming punch having an outer forming surface adapted to receive and form a hollow workpiece having a rim adapted to rest on the top of said annular wall means, said annular wall means formed with an annular slot opening at the top thereof closely adjacent said forming surface of said forming punch, said base formed with radial passages communicating with said annular slot, and evacuating means connected to said radial passages for evacuating the air in the space between the workpiece and said forming surface of said forming punch, said annular wall means comprising an annular member axially slideable relative to said base.

3,975,937

METHOD AND APPARATUS FOR SUPPLYING PLUGS TO PLUG MILLS

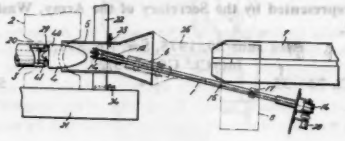
Haruo Kamimura; Yukio Yamashita, both of Yokohama; Toshitugu Nakai, Tokyo; Katsumi Wadano, Yokohama; Kozo Amada, Yokohama, and Yoshitane Matsuda, Yokohama, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 26, 1975, Ser. No. 635,313

Claims priority, application Japan, Nov. 30, 1974, 49-136621; Sept. 16, 1975, 50-125957

Int. Cl.² B21B *25/06*

U.S. Cl. 72—209 10 Claims



1. A method of supplying a plug to a plug mill comprising the steps of accommodating the plug in a container, moving the container from a plug recovering position toward an inlet guide in front of the mill rolls along a substantially straight transfer line at a speed sufficient to impart a predetermined moment of inertia to the plug, said substantially straight transfer line being at an angle with respect to the pass line of the mill, and quickly stopping said container when it reaches said inlet guide, thus ejecting the plug by utilizing said moment of inertia and feeding the plug to the front end of a mandrel bar of the plug mill.

3,975,938

ROLL CHANGING DEVICE FOR ROLLING MILLS OR THE LIKE

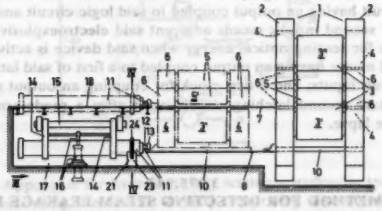
Arno Schmidt, Kreuztal-Ferndorf, and Rudolf Mueller, Hilchenbach-Allenbach, both of Germany, assignors to Schloemann-Siemag Aktiengesellschaft, Germany

Filed Dec. 5, 1975, Ser. No. 638,129

Claims priority, application Germany, Dec. 21, 1974, 2461005

Int. Cl.² B21B *31/08*

U.S. Cl. 72—239 7 Claims



1. In a rolling mill or the like having a housing,

a pair of working rolls,

a pair of backing rolls for each working roll,

said rolls being arranged to form a 4-high vertical rolling mill roll arrangement,

a window in said housing for receiving said rolls in a manner that the work roll as a set of rolls and the backing rolls as a set of rolls can be inserted into and removed from said window, said insertion and removal of said roll sets being performed at different elevational positions with respect to said window,

a piston cylinder assembly arranged on one side of said housing for independently moving said roll sets into and from said housing, and

means for adjusting said piston cylinder assembly to bring said piston cylinder assembly into a first working position corresponding to one of said elevational positions to effect said movement of said work roll set and into a second working position corresponding to said other elevational position to effect said movement of said backup roll set.

3,975,939

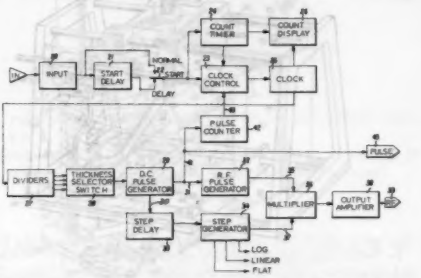
METHODS OF AND APPARATUS FOR SIMULATING ULTRASONIC PULSE ECHOES

Archibald Joseph McLean, Rte. 2, Box 239 D4, Waldorf, Md. 20601

Filed July 2, 1975, Ser. No. 592,477

Int. Cl.² G01N *29/00*

U.S. Cl. 73—1 DV 9 Claims



1. A method of simulating an ultrasonic signal corresponding to a material under test in order to test circuitry of an ultrasonic test set, comprising the steps of:

generating an initial pulse,

generating a train of d.c. pulses in response to said initial pulse, the pulse repetition frequency of the d.c. pulses being inversely proportional to the thickness of the material being simulated and directly proportional to the speed of sound in the material being simulated,

generating a radio frequency pulse with each d.c. pulse to produce a series of radio frequency pulses having a pulse repetition frequency of the d.c. pulses,

shaping each radio frequency pulse to resemble those generated by an ultrasonic transducer; and

modulating the amplitude of successive radio frequency pulses to produce a series of radio frequency pulses, which are selectively equal in amplitude, linearly declining in amplitude, or logarithmically declining in amplitude.

3,975,940

PORTABLE TESTER FOR MEASURING THE STATIC COEFFICIENT OF FRICTION BETWEEN A FLOOR SURFACE OR THE LIKE AND A SHOE SOLE OR HEEL MATERIAL OR THE LIKE

Robert J. Brungraber, Gaithersburg, Md., assignor to The United States of America as represented by the Secretary of Commerce, Washington, D.C.

Filed July 25, 1975, Ser. No. 599,270

Int. Cl.² G01N *19/02*

U.S. Cl. 73—9 8 Claims

1. Portable testing apparatus for indicating the static coefficient of friction between representative floor surfaces or the like and shoe materials or the like, comprising:

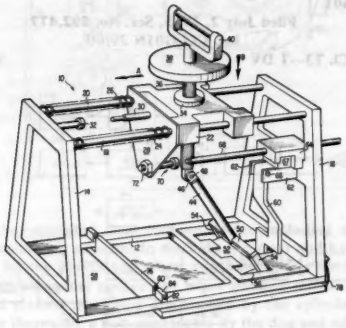
a base member adapted to be disposed upon one of said representative floor surfaces or the like;

a first, vertically disposed strut;

weight means secured upon the upper portion of said first strut for biasing said first strut downwardly under the influence of gravity;

means for mounting said first strut upon said base so as to permit said strut to move vertically within said plane and also translatably above and parallel to said base, said mounting means and said first strut being automatically movable solely under the influence of the gravitational force of said weight;

a second strut pivotably connected to the lower portion of said first strut and inclined with respect to the vertical plane of said first strut so as to define an angle therewith, said angle being continuously variable in response to said vertical and translational movement of said first strut;



yoke and shoe means for securing one of said representative shoe materials or the like to the lower end portion of said second strut, said yoke and shoe means projecting through said base member so as to permit said one of said representative shoe materials or the like to be disposed in contact with said one of said representative floor materials or the like; and

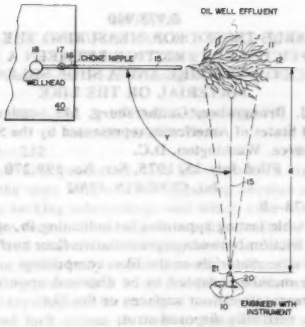
indicating means operatively associated with said mounting means of said first strut, and said second strut, for indicating said static coefficient of friction in response to the movements of said struts during a testing operation.

3,975,941

OIL WELL RATE METERING METHOD

Haidon J. Smith, Jakarta, Indonesia, assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Oct. 14, 1975, Ser. No. 622,366
Int. Cl.² G01N *25/00*; E21B *47/00*
U.S. Cl. 73—15 R **3 Claims**



1. A method of determining the production rate of an oil or gas well comprising the steps of

a. Leading the flow of fluid from the well into a pipe, open at its end,

b. Igniting the fluid flowing from pipe,

c. Determining the temperature of the flames by use of a remote radiant sensing apparatus, and

d. Comparing the temperature determined in step c) with a set of numbers of a prepared table.

3,975,942

CIRCUIT FOR DETERMINING THE FIRE-NO-FIRE CHARACTERISTICS OF ELECTROEXPLOSIVE DEVICES

David R. Dreitzler, Huntsville, and Lawrence B. Thorn, Madison, both of Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed June 30, 1975, Ser. No. 591,927
Int. Cl.² G01N *33/22*
U.S. Cl. 73—35 **5 Claims**

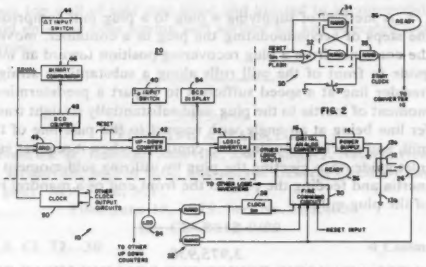


FIG. 2

1. Apparatus for determining the fire-no-fire characteristics of electroexplosive devices, comprising: a power supply for coupling an adjustable current to said electroexplosive device for a predetermined maximum time; a digital-analog converter having an output coupled to said power supply for operating said supply; a logic circuit for coupling a variable logic level signal to said converter; a firing circuit coupled to said converter for initiating operation of said converter; a latching circuit having an output coupled to said logic circuit and first and second inputs; means adjacent said electroexplosive device for sensing optical energy when said device is activated, said means having an output coupled to a first of said latching circuit inputs; and a first clock for coupling an output signal to said second latching circuit input after a predetermined time lapse.

3,975,943

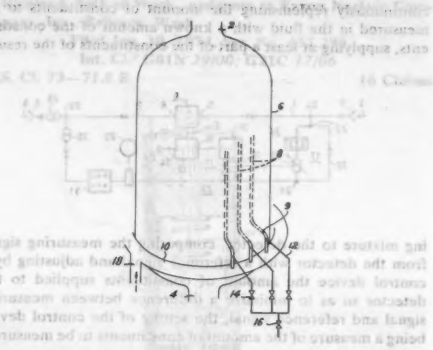
METHOD FOR DETECTING STEAM LEAKAGE IN HEAT-EXCHANGER HAVING CIRCULATION TUBES SURROUNDED BY LIQUID SODIUM AND DEVICES FOR THE APPLICATION OF SAID METHOD

Alain Brachet, Orsay, France, assignor to Electricite de France (Service National), Paris, France

Filed Aug. 19, 1974, Ser. No. 498,525
Claims priority, application France, Aug. 28, 1973, 73.30531
Int. Cl.² G01M *3/00*
U.S. Cl. 73—40 **8 Claims**

1. Improvement to the method for detecting a steam microleak in a heat-exchange having circulation tubes surrounded by an alkaline molten metal, said improvement consisting in using the normal operating fluid of the exchanger as the hydrogenated tracer fluid, injecting an inert gas successively into

groups of tubes comprising at least one circulation tube, and observing the readings of the leak detecting device based on



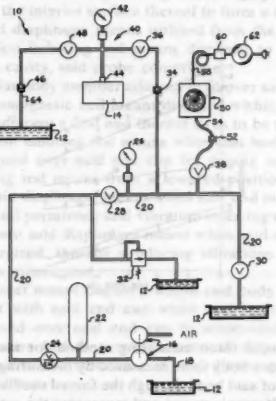
the measurement of hydrogen until a zero reading, indicative of the leaking tube.

3,975,944

HYDROSTATIC TESTING AND RECORDING APPARATUS

Theophil Aprill, Jr., Ann Arbor, Mich., assignor to Allied Automotive, Inc., Ann Arbor, Mich.

Filed June 23, 1975, Ser. No. 589,408
Int. Cl.² G01M 3/26
U.S. Cl. 73—40.5 R **4 Claims**



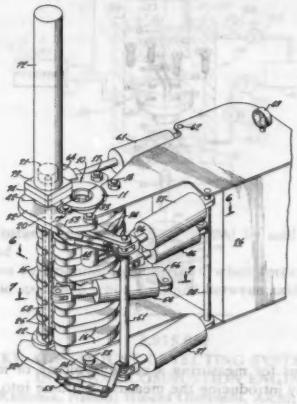
1. Apparatus for hydrostatically testing a hydraulic system and recording the results thereof comprising a reservoir for hydraulic fluid, a fitting adapted to be connected to said hydraulic system, a first pressure gauge mounted in communication with said fitting for registering the pressure in said system when the fitting is so connected, a recording pressure gauge mounted in communication with said fitting for recording the pressure in said system for a selected time period when the fitting is so connected, supply means including a pump for supplying hydraulic fluid under pressure from said reservoir to said fitting, return means for returning to said reservoir hydraulic fluid supplied by said supply means, first valve means for isolating said first pressure gauge and said fitting from said supply means and said return means, and additional valve means operable in conjunction with said first valve means for isolating said recording pressure gauge and said fitting from said pump and said reservoir.

3,975,945

APPARATUS FOR TESTING PIPE FOR LEAKS

Thomas D. Hauk, and Kenneth J. Carstensen, both of Huntington Beach, Calif., assignors to Service Equipment Design Co., Inc., Signal Hill, Calif.

Filed June 30, 1975, Ser. No. 591,502
Int. Cl.² G01M 3/28; F17D 3/04
U.S. Cl. 73—46 **30 Claims**



1. Apparatus for effecting external testing of a length of pipe to determine whether there is a leak therein, which apparatus comprises:

a. a plurality of casing sections adapted to open for lateral reception of a length of pipe, and further adapted to close and thus form a chamber around said pipe,

b. a cage provided around said casing sections to strengthen the same,

said cage being adapted to open for lateral reception of said length of pipe, and to close and thus effect said strengthening of said casing sections,

said cage when in closed condition being symmetrical about two planes which are perpendicular to each other and intersect along a line generally parallel to the axis of said pipe,

whereby said casing sections are effectively strengthened,

said cage when in closed condition having overlapped cage elements through which are provided bores extending longitudinally of said pipe,

c. means to lock said cage in closed condition,

said lock means including a lock pin adapted to move through said bores in said overlapped cage elements, thereby locking said cage in closed condition,

said lock means further including power means to shift said lock pin longitudinally of said pipe between locking and unlocking positions,

d. means to seal said chamber around said pipe length, when said casing sections and cage are in closed conditions, to thus prevent escape of fluid from said chamber except through a leak in said pipe,

e. means to inject fluid into said sealed chamber and to cause the pressure of said fluid in said chamber to increase to many thousands of psi, and

f. means to sense a reduction of the pressure in the thus-pressurized chamber,

said pressure reduction indicating the presence of a leak in the pipe length being tested.

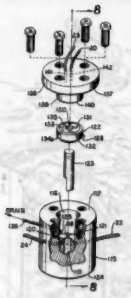
3,975,946
LIQUID CHROMATOGRAPHY SAMPLE MEASURING AND INTRODUCING APPARATUS

Dean M. Ball; Ronnie W. Camp, both of Norcross; Warren P. Hendrix, Lawrenceville, and Clyde Orr, Jr., Atlanta, all of Ga., assignors to Micromeritics Instrument Corporation, Norcross, Ga.

Division of Ser. No. 446,293, Feb. 27, 1974, Pat. No. 3,932,067. This application Dec. 17, 1974, Ser. No. 533,611

Int. Cl.² G01N *1/20, 31/08*

U.S. Cl. 73—61.1 C **4 Claims**



1. Apparatus for measuring a certain volume of material and selectively introducing the measured volume into a fluid stream, comprising:

a valve body;

a valve member selectively movably received in said valve body, said valve member having a first fluid flow passage therein;

said first fluid flow passage having a precisely defined volume equal to the certain volume to be measured;

a first fluid flow circuit in said valve body;

a second fluid flow passage in said valve member;

a second fluid flow circuit in said valve body;

said second fluid flow passage being located in said valve member to be in fluid flow alignment with said second flow circuit when said valve member is positioned in the sample measuring position placing said first fluid flow passage in said first fluid flow circuit;

means selectively positioning said valve member either to a sample measuring position placing said fluid flow passage in said first fluid flow circuit, or to a sample introduction position placing said fluid flow passage in said second flow circuit;

a third fluid flow passage located in said valve body to be in fluid flow alignment with an inlet portion of said second fluid flow circuit and with a bypass output line in said valve body, in response to selective rotation of said valve member to a bypass position; and

means on said valve member interrupting said second fluid flow circuit when said valve body is in said bypass position.

3,975,947
METHOD OF AND APPARATUS FOR QUANTITATIVE ANALYSIS

Johan Christiaan Willem Kruishoop, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

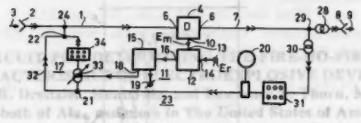
Filed Apr. 23, 1975, Ser. No. 570,728

Claims priority, application Netherlands, Apr. 24, 1974, 7405493

Int. Cl.² G01N *27/50*

U.S. Cl. 73—61.1 R **16 Claims**

1. A method of continuously and quantitatively determining at least one constituent of a fluid which is passed through a detector, in which a measuring signal is obtained at output terminals of the detector, which signal is a measure of the amount of constituents supplied to the detector, comprising continuously replenishing the amount of constituents to be measured in the fluid with a known amount of the constituents, supplying at least a part of the constituents of the resulting mixture to the detector, comparing the measuring signal from the detector with a reference signal and adjusting by a control device the amount of constituents supplied to the detector so as to minimize a difference between measuring signal and reference signal, the setting of the control device being a measure of the amount of constituents to be measured.



3,975,948
METHOD OF MEASURING AXIAL FORCE ON A BODY UTILIZING TWO VIBRATION MODES OF ULTRASONIC WAVES

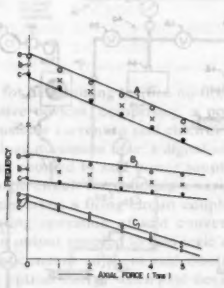
Takayuki Makino, Okazaki, and Haruhiko Toriyama, Toyota, both of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Apr. 24, 1975, Ser. No. 571,399

Claims prio-ity, application Japan, Oct. 11, 1974, 49-116958

Int. Cl.² G01H *13/00;* **G01B** *17/04;* **G01N** *29/00*

U.S. Cl. 73—67.2 **4 Claims**



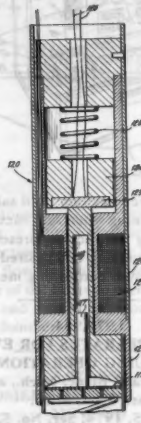
1. In an axial force measuring method for measuring the axial force on a body to be measured by measuring the natural frequencies of said body through the forced oscillation thereof caused by ultrasonic waves and measuring the rate of change of said measured natural frequencies where a relationship $(f\epsilon_2 - f\epsilon_1)/f\epsilon_1 = K[\{(1-\gamma\epsilon_2)\sqrt{1+\epsilon_1}/(1-\epsilon_1)\sqrt{1+\epsilon_2}\}-1]$ (where γ is the Poisson's Ratio) is held between natural frequencies $f\epsilon_1$ and $f\epsilon_2$ of said body existing when a strain $\epsilon_1(\epsilon_1 \geq 0)$ and another strain $\epsilon_2(\epsilon_2 > 0)$ are respectively produced in said body, said method comprising the steps of selecting a first ultrasonic frequency having a transverse-wave vibration mode for establishing $K \doteq 1$ in said relationship and a second ultrasonic frequency having a longitudinal-wave vibration mode for establishing $K > 1$ in said relationship, using said ultrasonic frequencies for respectively measuring the natural frequency of said body existing when an axial force is exerted thereon, performing a computational operation on said measured natural frequencies, and measuring the axial force exerted on said body from the result of said computational operation in accordance and with a predetermined result-versusaxial force calibration value.

3,975,949

LEAK DETECTOR PROBE FOR FUEL RODS

Keith O. Johnson, Kennewick, and Fredrick M. Coffman, Richland, both of Wash., assignors to Exxon Nuclear Company, Inc., Bellevue, Wash.

Filed Jan. 10, 1974, Ser. No. 432,290
Int. Cl.[2] G01N *29/00*; G21C *17/06*
U.S. Cl. 73—71.5 R 16 Claims



1. A probe for sensing the vibrational frequencies of a nuclear fuel rod end cap having flexible diaphragm means secured to the interior surface thereof to form a cavity on one side of said diaphragm means isolated from the nuclear fuel and vibration inducing rod means disposed to move freely within said cavity, said probe comprising:

a. a tubular body member adapted to fit over said end cap;

b. electromagnetic coil means disposed within said tubular body adjacent a first end thereof so as to be adjacent said vibration inducing rod means when said body member is positioned over said end cap for raising said vibration inducing rod means from a lowered position in contact with said diaphragm means when said coil means is energized and permitting said vibration inducing rod means to drop onto said diaphragm means when said coil means is de-energized, thereby producing vibrations of said diaphragm means; and

c. transducer means disposed within said body member for contact with said end cap when said body member is positioned over said end cap to sense said vibrational frequencies and to provide electrical output signals in response to the vibrations of said diaphragm means in said end cap.

3,975,950

APPARATUS FOR TESTING MATERIAL STRENGTH

Karoly Erdei, 1470 Morton Place, Los Angeles, Calif. 90026

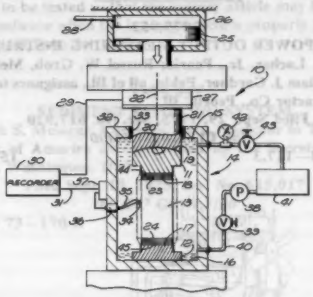
Filed Mar. 17, 1975, Ser. No. 559,219
Int. Cl.[2] G01N *3/10*
U.S. Cl. 73—94 20 Claims

1. Apparatus for testing the strength of a specimen of material, comprising:

two spaced platens between which said specimen is confined while force is applied to the specimen;

a lamina pack interposed between a face of one of said platens and an opposed surface of said specimen for transmitting forces therebetween, said lamina pack including a plurality of plates one of which exerts force against said surface of the specimen and another of which is acted against by said platen face;

successive ones of said plates having smooth opposed surfaces which are slidably movable laterally relative to one another under load in a relation permitting a change in lateral dimension of said surface of said specimen without



substantial restraint being offered by said lamina pack; and

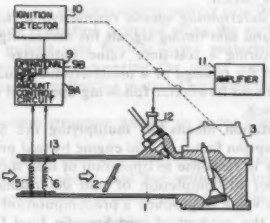
means for monitoring the result when force is applied to said specimen while confined between said platens.

3,975,951

INTAKE-AIR AMOUNT DETECTING SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

Tokio Kohama, Nishio; Hideki Obayashi, Aichi; Tadashi Hattori, Nishio, and Minoru Nishida, Okazaki, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed Mar. 20, 1975, Ser. No. 560,171
Claims priority, application Japan, Mar. 21, 1974, 49-32384; May 13, 1974, 49-53624; May 13, 1974, 49-53625; May 13, 1974, 49-53626; Nov. 15, 1974, 49-132171
Int. Cl.[2] G01M *15/00*
U.S. Cl. 73—116 8 Claims



1. An intake-air amount detecting system for an internal combustion engine comprising;

a first temperature detecting means arranged in an air-intake path of an internal combustion engine for detecting the temperature of the intake-air to said engine;

an electrical heating means arranged in said intake path for heating said intake-air;

a second temperature detecting means arranged in said intake path for detecting the temperature of the intake-air having been heated by said electrical heating means;

tubular path means including a heat insulating material arranged to cover said first and second temperature detecting means and said electrical heating means;

a heat amount control means connected to said first and second temperature detecting means and said electrical heating means for controlling the amount of heat generated by said electrical heating means so as to continuously maintain a constant difference between the temper-

ature of the heated intake-air and the non-heated intake-air; and

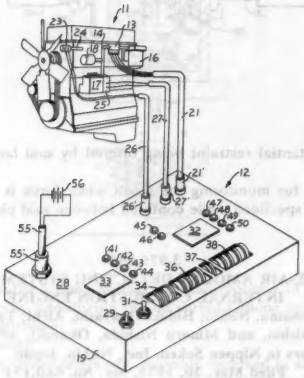
an operational circuit means for calculating the amount of heat generated by said electrical heating means to determine the amount of intake-air to said engine.

3,975,952

ENGINE POWER OUTPUT MEASURING INSTRUMENT

Thomas F. Lacher, Jr., Peoria; Russel W. Grob, Metamora, and William J. Gardner, Pekin, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Sept. 29, 1975, Ser. No. 617,920
Int. Cl.² G01M *15/00*
U.S. Cl. 73—117.3 **15 Claims**



1. Apparatus for determining the power output of an engine comprising:

a flowmeter having means for producing fuel flow electrical signals indicative of fuel flow into said engine;

a source of timing signals;

a start-test switch;

test time determining means responsive to said fuel flow signals and said timing signals for measuring and temporarily storing a test-time value indicative of the time required for passage of a predetermined quantity of fuel through said flowmeter following operation of said start-test switch;

precomputation means for multiplying the Specific Fuel Consumption factor of said engine by said predetermined quantity in response to operation of said start-test switch and prior to completion of said determination of said testtime value to produce a precomputation value representing the product of said Specific Fuel Consumption factor and said fuel quantity; and

final computation means for dividing said precomputation value by said time value to produce a power value indicative of engine power output.

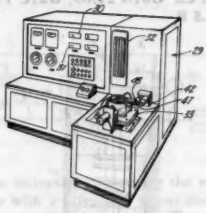
3,975,953

METHOD AND APPARATUS FOR REPRODUCING OPERATING CONDITIONS IN INDUCED FLOW DEVICES

Richard L. Smith, Livonia, and Peter J. Mosher, Northville, both of Mich., assignors to Scans Associates, Inc., Livonia, Mich.

Filed June 25, 1974, Ser. No. 483,320
Int. Cl.² G01M *19/00*
U.S. Cl. 73—118 **38 Claims**

1. A method of reproducing operating conditions in induced variable flow devices having a vacuum controlling member to vary the flow therethrough, said method including the steps of producing a predetermined air through said induced flow device with the aid of air flow measuring devices, obtaining at least one desired predetermined vacuum in said induced flow device by rotating the vacuum controlling member of said induced flow device in proportion to the difference between the actual vacuum present in said induced flow device at a



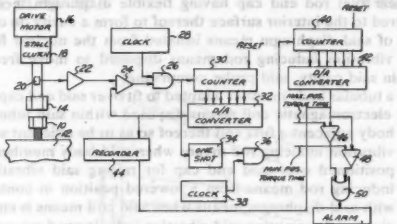
given time and the desired vacuum until said desired vacuum is achieved, and determining when said vacuum is achieved by continuously monitoring the vacuum present in said induced flow device, and upon reaching said desired vacuum, stopping the rotation of said vacuum controlling member.

3,975,954

METHOD AND APPARATUS FOR EVALUATING TORQUING OPERATIONS

Richard G. Barnich, Grand Blanc, Mich., assignor to Process Computer Systems, Inc., Flint, Mich.

Filed Nov. 25, 1974, Ser. No. 526,691
Int. Cl.² B25B *23/14*
U.S. Cl. 73—139 **7 Claims**



1. A system for applying a torquing force to a workpiece, comprising: a tool for engaging the workpiece; a drive system for applying rotational force to the tool; means for terminating the application of driving force upon attainment of a predetermined torque on the workpiece; sensor means measuring the torque applied to the workpiece; means for recording the peak torque attained at any time during the torquing operation; and means for recording the duration of time during the torquing operation at which the torque applied to the workpiece exceeds the torque previously applied to the workpiece during the torquing operation.

3,975,955

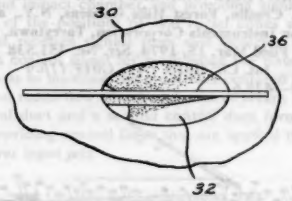
EDGETONE SUPPRESSION DEVICE FOR WIND TUNNEL WALLS

Nathan S. Dougherty, Jr., and Charles F. Anderson, both of Tullahoma, Tenn., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed June 27, 1975, Ser. No. 590,981
Int. Cl.² G01M *9/00*
U.S. Cl. 73—147 **2 Claims**

1. In a wind tunnel having an expansion nozzle; means for supplying compressed gas upstream of said nozzle; a test

section downstream of said nozzle; a diffuser downstream of said test section; a plenum chamber surrounding the test section; a plenum evacuation duct connected to said plenum chamber; at least a portion of the walls of said test section having a plurality of holes extending through the walls to permit the flow of gas from the test section to the plenum



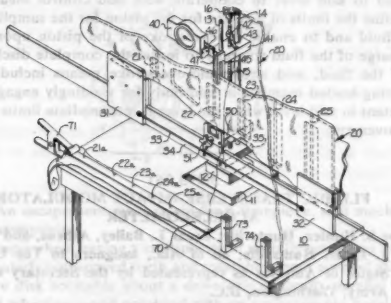
chamber; an edgetone suppressor for said wind tunnel test section comprising: a splitter plate in all of the holes in the walls of the test section; said splitter plate extending parallel to the direction of flow from a front leading edge of the holes to the trailing edge of the holes to thereby divide the hole into a left half portion and a right half portion in the direction of flow through the chamber.

3,975,956

SUPPORT HOSIERY TESTING APPARATUS AND METHOD

Robert Peel, Winston-Salem, N.C., assignor to National Association of Hosiery Manufacturers, Inc., Charlotte, N.C.

Filed June 23, 1975, Ser. No. 589,012
Int. Cl.² G01L *5/04*; G01B *3/02*
U.S. Cl. 73—159 **6 Claims**



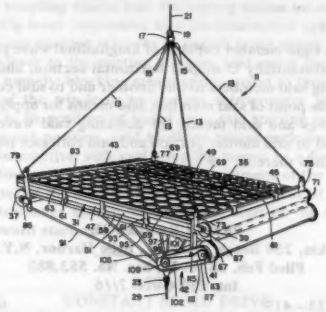
1. An apparatus for the non-destructive testing of the compressive force of hosiery articles comprising
   a. an elongate form onto which the hosiery article is drawn for testing,
   b. means spaced along said form for moving corresponding spaced regions of the hosiery article outwardly of said form a predetermined distance,
   c. means for indicating when the spaced regions of the hosiery article have been moved outwardly said predetermined distance,
   d. means operatively associated with said form for indicating the amount of force required to move said spaced regions of the hosiery article outwardly of said form said predetermined distance, and
   e. an elastic marking tape including spaced indicia indicating the spaced regions of the hosiery article to be tested, said elastic marking tape being adapted to be fixed at one end in a predetermined position adjacent one end of the hosiery article when in relaxed condition and prior to being drawn on said form, said elastic marking tape also being adapted to be stretched along the length of the hosiery article to a predetermined position adjacent the other end of the hosiery article with said spaced indicia corresponding to said spaced regions of the hosiery article to be tested so that the hosiery article may be marked to indicate when the hosiery article is properly positioned on said form for testing.

3,975,957

SEDIMENT SAMPLING SYSTEM

Roderick S. Mesecar, Corvallis, Oreg., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 19, 1975, Ser. No. 615,017
Int. Cl.² G01N *1/20*
U.S. Cl. 73—170 A **9 Claims**



1. A sediment sampling system comprising:
   a. a frame having an about flat bed;
   b. first means for storing a sheet of flexible sample collecting material at one end of said bed;
   c. second means for storing a sheet of flexible cover material;
   d. third means for simultaneously pulling said flexible sheet of sampling collecting material along the surface of said bed for pulling said flexible cover material from said second means and covering the upper surface of said flexible sample collecting material with said flexible cover material;
   e. a honeycomb structure having an about flat lower surface; and
   f. said honeycomb structure being connected to said frame and positioned above said bed with said lower surface being spaced from and about parallel to said bed.

3,975,958

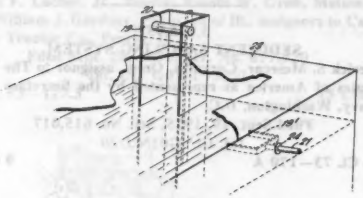
APPARATUS FOR LEVEL MEASUREMENT OF FREE FLOWING SUBSTANCES, SOLID SUBSTANCES OR COMBINATION OF THESE IN TANKS, CONTAINERS, RESERVOIR OR THE LIKE

Bjorn R. Hope, Lommedalen, Norway, assignor to Navaltronic A/S, Oslo, Norway

Filed Apr. 3, 1974, Ser. No. 457,399
Claims priority, application Norway, May 5, 1973, 1400/73
Int. Cl.² G01F *23/28*
U.S. Cl. 73—290 V **2 Claims**

1. In apparatus for measurement of the level of a substance in a container having a substantial depth, comprising a sonic wave propagating means secured to said container and having an emitter portion and a collector portion both extending substantially the entire depth of said container, from a position above the highest level of said substance to be measured to below the lowest level thereof to be measured, means for applying sonic waves to said emitter portion whereby said

waves are propagated in and emitted from said emitter portion and are collected by and propagated in said collector portion, and means for detecting said collected waves to produce indications therefrom of the level of said substance on the basis of the relationship between said emitted and collected waves, the improvement wherein said means inducing sonic waves comprises emitter and collector portions each in the



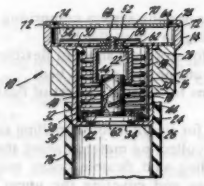
form of a rigid member capable of longitudinal wave propagation of substantially U-shaped horizontal section, and means for affixing said members to one another and to said container at the node point of said member, said means for applying said sonic waves and said means for detecting said waves being connected to said emitter portion and said collector portion at the top ends thereof.

3,975,959

PRESSURE GAUGE

Sam Larkin, 254 Beach 140th St., Belle Harbor, N.Y. 11691

Filed Feb. 28, 1975, Ser. No. 553,882
Int. Cl.² G01L 7/16
U.S. Cl. 73—419 **6 Claims**



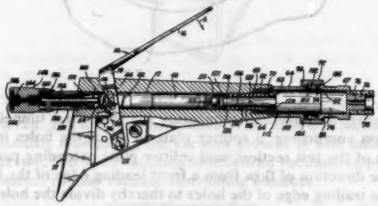
1. A gauge for measuring fluid pressure, said gauge comprising a dial plate provided with equally spaced pressure readings disposed around a face of said dial plate, a pointer to indicate said pressure readings, a rotatable member connected to said pointer for rotating said pointer above said face to a proper one of said readings, a plunger movable in a linear path in a direction of its axis, said plunger including a surface against which said fluid pressure is exerted, spring means exerting a spring pressure on said plunger which is in an opposite direction to said fluid pressure for determining movement of said plunger in said linear path to any one of predetermined positions corresponding to associated fluid pressures, said spring means having a spring characteristic which causes said predetermined positions to be non-proportional to said associated fluid pressures, one of said rotatable member and said plunger being provided with guide means corresponding to said spring characteristic for relating said non-proportional predetermined positions to radial positions which are proportional to said associated fluid pressures, and the other of said rotatable member and said plunger being provided with follower means engaging said guide means for rotating said rotatable member about said plunger axis with respect to said radial positions as said plunger moves in said linear path so that said pointer is rotated to one of said pressure readings corresponding to said fluid pressure acting against said plunger, said guide means including at least one groove, said follower means including at least one tab member engaging in said groove, said groove having varying degrees of slope with respect to said axis of said plunger, a degree of slope at one end of said guide means being greater than a degree of slope at an opposite end of said guide means to correspond to said spring characteristic.

3,975,960

MANUAL FLUID SAMPLER WITH OVERSTROKE

Michael E. Croslin, Forest Hills Gardens, N.Y., assignor to Technicon Instruments Corporation, Tarrytown, N.Y.

Filed Mar. 15, 1974, Ser. No. 451,538
Int. Cl.² G01N 1/14; G01F 11/06
U.S. Cl. 73—425.6 **17 Claims**



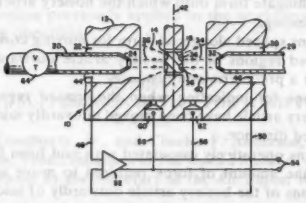
1. A fluid sampler comprising a longitudinallly extended, portable body provided with a bore extending longitudially therethrough, a nozzle means at one end of said bore and provided with a chamber, said nozzle means including a nozzle through which to communicate with said chamber, a plunger located partly in said chamber and partly in said bore, a piston slidable in said bore, control means at least partly in said bore to adjust the stroke of said piston, a lever mounted on said body to operate said plunger through the intermediary of said piston whereby a fluid may be drawn into or discharged from said chamber, stroke-and-overstroke means operatively coupled to said lever to cooperate with said control means to define the limits of a stroke for the piston for the sampling of a fluid and to enable an overstroke of the piston upon discharge of the fluid whereby to insure the complete discharge of the fluid, said stroke-and-overstroke means including a spring-loaded member in said body for yieldingly engaging a detent in said lever when the lever is intermediate limits of its movement.

3,975,961

FLUIDIC TRANSVERSE-IMPACT MODULATOR ACCELEROMETER

Joe S. Hunter, Huntsville; Escar L. Bailey, Athens, and Little J. Little, Huntsville, all of Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Nov. 28, 1975, Ser. No. 636,194
Int. Cl.² G01P 15/02
U.S. Cl. 73—515 **7 Claims**



1. A fluidic accelerometer for measuring acceleration along an axis of the accelerometer comprising: a housing that defines a fluid impact chamber; a pair of power jet tubes for directing two power jet fluid streams into said chamber, said power jet tubes being mounted in said housing in an opposing

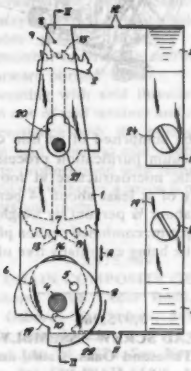
position so that the longitudinal axes of the tubes coincide and the power jet tubes discharge toward one another; a proofmass disposed in said chamber at a point where the axially opposing power jet streams impact the proofmass, said proofmass having surfaces contoured so that the streams are reflected from the proofmass in the form of radial cones; detector means for detecting the position of said radial flow cones in said fluid impact chamber and providing signals that are indicative of the positions of said radial cones and control means that receives signals from said detector means and develops a control signal for modulating the power jet fluid streams so as to maintain the proofmass centered to produce symmetrical radial flow cones; said control means including a first control duct and a second control duct formed in said housing providing control flows that are applied transversely to the power input jets.

3,975,962

CLICK WORK FOR A WATCH MOVEMENT

Paul Albert Tuetey, Le Locle, Switzerland, assignor to Les Fabriques d'Assortiments Reunies, Le Locle, Switzerland

Filed Aug. 13, 1975, Ser. No. 604,237
Int. Cl.² F16H *27/00*; G04B *15/00*
U.S. Cl. 74—1.5 **10 Claims**



1. An escapement mechanism for a timepiece, said mechanism comprising:

an escape wheel having a multiplicity of radially extending and angularly equispaced teeth and rotatable about a wheel axis;

a drive disk rotatable about a drive axis generally parallel to said wheel axis and provided with an eccentric pin parallel to said drive axis, said disk having a periphery formed with a radially open notch;

an actuating member formed with an abutment engageable in said notch and against said periphery and with a cam opening receiving said pin and engageable therewith, said member having a pair of pallets and being reciprocal in a substantially straight line adjacent said wheel between one position with one of said pallets engaging between two of said teeth on one side of said wheel and another position with the other pallet engaging between another two teeth on the opposite side of said wheel;

spring means for normally urging said member into said one position; and

means for rotating said disk between a first angular position corresponding to said one position of said member with said abutment at said periphery outside said notch and said pin out of engagement with said cam opening, and a second angular position corresponding to said other position of said member with said abutment in said notch and said pin engaging said opening.

3,975,963

TRIP LEVER GUARD MEANS FOR REEL SPINNING GAMES

Frank G. Nicolaus, Chicago, Ill., assignor to Bally Manufacturing Corporation, Chicago, Ill.

Filed July 16, 1974, Ser. No. 488,916
Int. Cl.² F16H *57/06*
U.S. Cl. 74—17.5 **11 Claims**

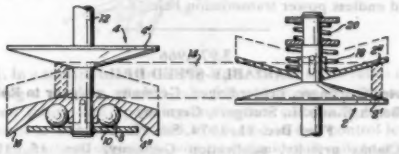
1. Trip-lever guard means for reel-spinning mechanism of the type having a trip-lever oscillable between a starting and a trip-out position to initiate an operating cycle of said mechanism, together with a drive lever and cooperative handle means oscillable between limits in each cycle to impart advance to the trip-lever toward and to said trip-out position, and spring means urging the trip-lever back to starting position with triggerable coupling means operative to couple said drive lever with the trip-lever during travel of the latter from starting toward trip-out position and means operative to trigger the coupling means into decoupling action on movement of the trip-lever responsive to a predetermined approach to the trip-out position whereby to permit rapid spring return of the trip-lever to the starting position, said guard means comprising, namely: blocking means spring-urged to thrust behind a part of the trip-lever to prevent retrogressive movement thereof in its position of travel from said starting position to said trip-out position, said blocking means including further means interactive with said coupling means as a function of decoupling action thereof to effect movement of the blocking means out of the path of retrogressive movement of said part of the trip-lever substantially prior to start of the trip-lever back toward starting position.

3,975,964

CONSTANT SPEED DRIVE

Frederick John Adams, Campton, England, assignor to Cam Gears Limited, Hitchin, England

Filed Nov. 27, 1974, Ser. No. 527,539
Int. Cl.² F16H *55/52*
U.S. Cl. 74—230.17 A **15 Claims**



1. A belt-drive system comprises a driving pulley and a driven pulley connected by a belt, each pulley comprising two half-sheaves having opposed faces so that the two pulleys cooperate to provide a belt supporting surface of predetermined circumferential length when the belt is normally tensioned between them, wherein a movable half-sheave of one of the pulleys is axially displaceable relative to its other half-sheave by axially biasing spring means and a movable half-sheave of the other pulley is axially displaceable relative to its other half-sheave by radially displaceable balls riding over ramp means associated with a radially extending guide face of the movable half-sheave axially remote from its end face which opposes an end face of its other half-sheave, wherein the balls are located at their radially innermost positions when the system is running at a predetermined drive speed so that upon increase of speed of the system above the predetermined one the balls are displaced radially outwardly under centrifugal force as a result of which the axial distance between the movable half-sheave of the other pulley and its other half-sheave will be changed and the circumferential length of the belt supporting surface correspondingly changed, and the resulting changed tension on the belt will cause the movable half-sheave of the one pulley to be moved relative to its bias

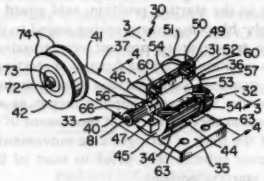
so as temporarily to provide a belt supporting surface of different size than the predetermined one, whereby the speed ratio between the driving pulley and the driven pulley is changed, and wherein said spring means and said ramp means coact to provide a non-linear rate of axial displacement of the movable half-sheaves and consequent non-linear rate of speed ratio change so that the axial displacement and speed ratio change is at a first substantially constant rate for a predetermined extent thereof and is at a second and different substantially constant rate for a subsequent predetermined extent of such displacement.

3,975,965

BELT TENSIONING APPARATUS

Billy L. Speer, Springfield, Mo., assignor to Dayco Corporation, Dayton, Ohio

Filed June 27, 1975, Ser. No. 591,206
Int. Cl.² F16H 7/22, 7/10
U.S. Cl. 74—242.11 R **30 Claims**



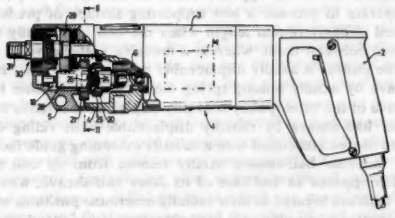
1. A tensioning apparatus for an endless power transmission belt comprising, an elastomeric material, means supporting said elastomeric material adjacent an associated power transmission belt, and means operatively connected between said elastomeric material and said power transmission belt by engaging said elastomeric material and said power transmission belt and employing the elastic properties of said elastomeric material to exert a controlled tensioning force against said endless power transmission belt.

3,975,966

VARIABLE-SPEED DRILL

Dieter Grozinger, Echterdingen, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Dec. 11, 1974, Ser. No. 531,616
Claims priority, application Germany, Dec. 15, 1973, 2362432
Int. Cl.² F16H 3/08, 5/52
U.S. Cl. 74—329 **8 Claims**



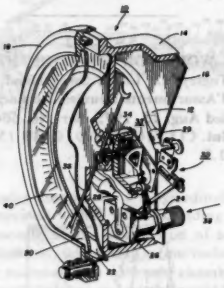
1. A variable-speed drill, comprising a housing; a motor in said housing; a tool shaft which is to be driven in rotation by said motor; a gear drive interposed between said motor and said tool shaft and transmitting power from the former to the latter, said gear drive having an intermediate shaft and at least two gear sets providing different selectable gear ratios so that said tool shaft is driven at different speeds and subject to different torques in dependence upon which of said gear ratios is selected; and safety coupling means coupling said intermediate shaft with said tool shaft and operative for uncoupling said shafts from one another at a predetermined torque level which is substantially the same irrespective of which of said gear ratios is selected for driving said tool shaft in rotation.

3,975,967

CORROSION RESISTANT BOURDON TUBE

Jack Conti, Norwalk, Conn., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Apr. 21, 1975, Ser. No. 570,523
Int. Cl.² G01L 7/04
U.S. Cl. 73—411 **7 Claims**



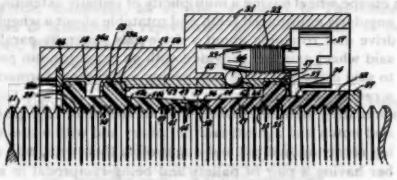
5. A Bourdon tube comprised of an iron chromium alloy obtained from a vacuum purification process and having a predominantly ferritic microstructure at room temperature consisting essentially of at least about 24 percent by weight chromium, at least about ½ percent by weight molybdenum, less than about 250 p.p.m. combined carbon plus nitrogen and the balance iron while being essentially free of volatile metallic impurities.

3,975,968

PRECISION LEAD SCREW ASSEMBLY AND NUT

Frank R. Chaffin, Thousand Oaks, Calif., assignor to W. S. Shamban & Co., Los Angeles, Calif.

Filed July 22, 1974, Ser. No. 490,317
Int. Cl.² F16H 55/18
U.S. Cl. 74—441 **6 Claims**



1. An assembly comprising:

a nondeformable screw member having a generally helical thread on the exterior thereof formed by a rib having a crest and adjacent sidewalls, said rib defining a helical groove having a root located between the side walls of adjacent crests;

a housing cooperating with said screw;

nut means received within said housing and cooperating with said screw member whereby relative rotation between said nut and screw causes relative translation therebetween;

said nut means including a helical thread on the interior thereof formed by a rib having a crest and adjacent side

walls, said rib defining a helical groove having a root located between the side walls of adjacent crests;

said nut means being a two piece nut member formed entirely of plastic material deformable relative to said screw, each piece of said nut including a butting end portion forming a seal therebetween, wherein the outer surface of said nut includes spaced shoulder means defining therebetween a slot;

an incompressible material located within and filling said slot;

a metal retainer means cooperating with said two piece nut member to maintain the same in sealing relation;

an adjustable means to apply pressure to said nut isostatically to urge the side walls of the helical thread of said nut into sliding pressure frictional engagement with the opposing side walls of said screw whereby backlash between said nut and screw is substantially reduced;

said means to apply an isostatic pressure including means forming an incompressible member surrounding at least a portion of the center surface of said nut and being supported on said housing;

means substantially completely confining said incompressible member whereby pressure on said incompressible member is transmitted to said nut isostatically;

means to vary the pressure on said incompressible member, consisting of an adjustable pressure applying means operative to effect radially inward movement of the crests of said nut towards the roots of said screw whereby the backlash may be varied between said nut and screw;

said adjustable pressure applying means including a threaded member received in said housing and having a tapered forward portion; and

means cooperating with said threaded member to apply pressure to one of said retainer and incompressible material in accordance with the position of said threaded member in said housing; said roots and crests of said screw being proportioned with respect to the crests and roots of said nut whereby a space is provided between the facing crests and roots.

3,975,969

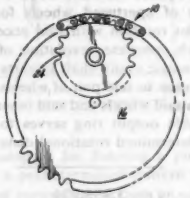
TIGHT CHAIN COMPOSITE GEAR DEVICE

Merritt A. Osborn, 8706 Cedar Road, Chesterland, Ohio 44026, and Osborne C. Dodson, 369 Bentleyville Road, Chagrin Falls, Ohio 44022

Filed Jan. 14, 1974, Ser. No. 432,900

Int. Cl.[2] F16H *55/06, 1/20*

U.S. Cl. 74—465 **5 Claims**



1. A composite gear assembly comprising, an annular link chain member having circumferentially spaced gear tooth engaging openings disposed to engage the teeth of at least two axially spaced toothed wheels, first wheel means having regularly spaced teeth engaging each of said tooth openings for said first wheel means, second wheel means having regularly spaced teeth fewer in number than the first toothed wheel and being axially offset with respect to said first toothed wheel means engaging the openings disposed to be engaged thereby, said chain being essentially nonflexible and free of any articulated movement at least in the region engaging said first wheel means, when engaging said first wheel means (.), said chain is mounted on the first wheel means under tension and strained less than the proportional limit of its material.

5. The method of forming a composite gear structure comprising the steps of providing first and second toothed wheels, said second wheel having fewer teeth than the first, providing a flexible link chain having a shorter length than the length of the pitch line of the first wheel, stressing the chain to strain it less than the proportional limit of its material and engage all the teeth of the first wheel with all the links of the chain and thereafter securing the chain in this strained position, and engaging the teeth of the second wheel with the chain.

3,975,970

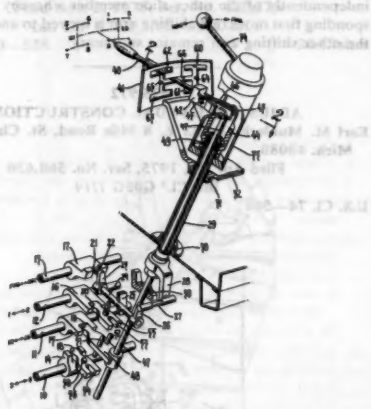
MULTI THROW SELECTOR MECHANISM USING PIVOTED LINKS

Lee Eugene Elfes, Bloomfield Hills, and Joseph William Beckerman, Livonia, both of Mich., assignors to Massey-Ferguson Inc., Detroit, Mich.

Filed May 14, 1975, Ser. No. 577,488

Int. Cl.[2] G05G *9/18*

U.S. Cl. 74—473 R **4 Claims**



1. In a transmission providing a plurality of speed ratios and having a plurality of shift rails for selectively engaging said speed ratios, and operating mechanism comprising manual control lever, and a first link connected to said control lever and operatively associable with one of said shift rails to selectively move the same, the improvement comprising a second link pivotally mounted intermediate its ends operatively associable with another of said shift rails, with said first link being selectively engageable with said second link to effect movement of the latter link and the shift rail associated with said second link.

3,975,971

SHIFT MECHANISM FOR STANDARD TRANSMISSION

Branko J. Radenovic, Apartment 2, 1138 Davenport Road, Toronto, Ontario, Canada

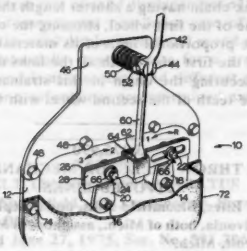
Filed June 2, 1975, Ser. No. 582,904

Int. Cl.[2] G05G *9/02, 9/16*

U.S. Cl. 74—473 R **8 Claims**

1. A shifting mechanism for a manual transmission which has first and second spaced apart transmission gear shifting arms comprising first and second slide members, and a shifting means for selectively shifting said first or second slide member in a to and fro direction, said first slide member having one end pivotally connected to a first shifting arm and having at the other end means for connecting said first slide member to a second shifting arm which permits said first slide member to move to and fro independently of said second shifting arm,

said second slide member having one end pivotally connected to said second shifting arm and having at the other end means for connecting said second slide member to said first shifting arm which permits said second slide member to move to and



fro independently of said first shifting arm, said shifting means being adapted to move a selected first or second slide member independently of the other slide member whereby the corresponding first or second shifting arm is moved to and fro while the other shifting arm remains stationary.

3,975,972

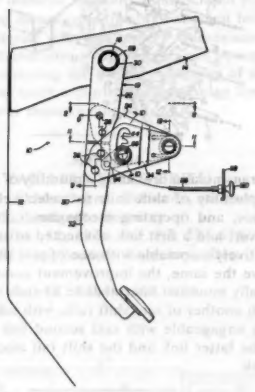
ADJUSTABLE PEDAL CONSTRUCTION

Earl M. Muhleck, 20203 E. 8 Mile Road, St. Clair Shores, Mich. 48080

Filed Apr. 16, 1975, Ser. No. 568,630

Int. Cl.² G05G 1/14

U.S. Cl. 74—560 **41 Claims**



1. An adjustable pedal construction comprising an upper pedal part and a lower pedal part, said upper pedal part being adapted to be pivotally mounted on a support, and adjustable connecting means interposed between and connected to opposing end portions of said pedal parts, said adjustable pedal construction having a plurality of operating positions where said pedal parts are releasably locked together in a selected one of said operating positions by said connecting means, said adjustable pedal construction having an unlocked position where said lower pedal part is movable relative to said upper pedal part upon release of said connecting means to permit adjustment between said parts when selecting another of said operating positions, the parts of said pedal construction being adapted to pivot as a unit when said adjustable pedal construction is in one of said operating positions.

3,975,973

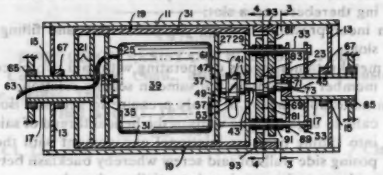
IN-DRUM DRIVE AND SPEED REDUCER

Charles A. Haase, 2050 Blueberry Lane, Aurora, Ill. 60538

Filed Apr. 17, 1973, Ser. No. 351,975

Int. Cl.² F16H 1/28

U.S. Cl. 74—805 **5 Claims**



1. In-drum drive and speed reducer apparatus for use within a cylindrical rotatably mounted drive drum in belt drive installations and the like, said apparatus being effective for rotatably driving the drum and a transport belt held in frictional contact therewith, said apparatus comprising:

a. an electric motor stationarily disposed within said drive drum, said motor being provided with a pair of motor mounts and having a motor shaft and a supply cord connected to opposite ends thereof,

b. a rotatably mounted eccentric crank shaft coupled to said motor shaft and supporting a pair of identical and correspondingly apertured pulley-like wheels carried thereby, said wheels being disposed in predetermined equal but opposite eccentric relationship relative to the center line of said motor shaft and said crank shaft,

c. a flexible output ring comprised of two sections of distinctly different densities including an inner band-like section composed of a high density material and an outer compressible section composed of a low density compressible material, said inner section being disposed in cooperating relationship relative to the peripheries of said pair of wheels and said outer section being fixed to the inner surface of said drive drum,

d. means providing drivable cooperation between said pair of apertured wheels and said high density inner band-like section of said flexible output ring, said cooperation extending for at least 180° of the peripheries of each of said wheels and presenting said inner band-like section of said output ring with an obround configuration as accommodated by the low density material of said outer compressible section of said flexible output ring, and

e. stationarily disposed means associated with the apertures of said pair of apertured wheels for restraining said wheels against rotation with said eccentric crank shaft, whereby each complete revolution of said motor shaft and said eccentric crank shaft imparts an eccentric nonrevolving motion to said pair of wheels and said cooperation between said wheels and said inner band-like section of said flexible output ring serves to rotate said drive drum a predetermined rotational distance.

3,975,974

APPARATUS FOR PRODUCING CONTINUOUS STRIP OF UNCURED RUBBER AND LIKE RAW MATERIALS

Wilbur E. Harris, Indianapolis, Ind., assignor to Uniroyal Inc., New York, N.Y.

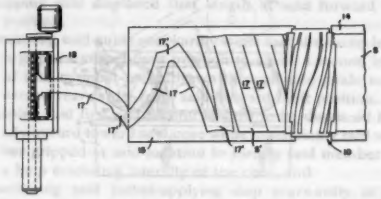
Division of Ser. No. 65,673, Aug. 20, 1970, which is a continuation of Ser. No. 537,474, March 25, 1966, abandoned. This application Nov. 20, 1972, Ser. No. 308,058

Int. Cl.² B29H 7/18; B26D 1/36, 3/12

U.S. Cl. 83—1 **11 Claims**

1. Apparatus for producing a continuous strip of uncured rubber or like raw material, comprising back-up means and cutter means juxtaposed to each other to define therebetween a path along which a sheet of such material can be disposed, said cutter means being provided with an even number of

blades extending transversely to said path, the cutting edges of said blades being recessed each at one end remote from the recessed end of the next adjacent blade, and means for moving said cutter means so as to cause said blades to engage and penetrate into the section of the sheet disposed between said



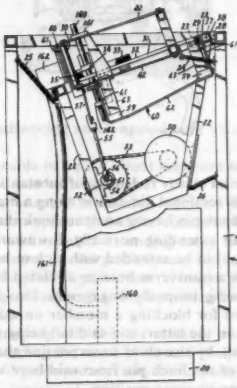
cutter means and said back-up means, thereby to form in the sheet a plurality of slits spaced from one another longitudinally of the sheet and beginning in an alternating sequence at the opposite side edges of the sheet and each terminating short of the respective other side edge of the sheet.

3,975,975

PAPER SAWING MACHINE

Joe D. Giulie, and Leslie E. Worcester, both of Los Altos, Calif., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Oct. 2, 1975, Ser. No. 618,899
Int. Cl.² B26D 7/06; B23D 49/00
U.S. Cl. 83—410 6 Claims



1. A machine adapted for forming a plurality of spaced nonlinear slots of a predetermined pattern through an edge portion of a stack of paper starting from an edge surface of the stack, said machine comprising:

cutting means including

a plurality of saw blades, each blade comprising an elongated portion having a longitudinal axis and a multiplicity of cutting teeth disposed along said elongated portion;

means for mounting said blades in a generally side by side spaced parallel relationship with the axes of said elongated portions in a common plane; and

means for moving said saw blades to afford cutting engagement with said cutting teeth from any direction essentially normal to the axes of said saw blades;

support means adapted for holding a said stack of paper comprising a planar support surface and means adapted for releasably securing the stack of paper on said planar support surface with the edge surface of the stack of paper in a predetermined position relative to said support surface; and

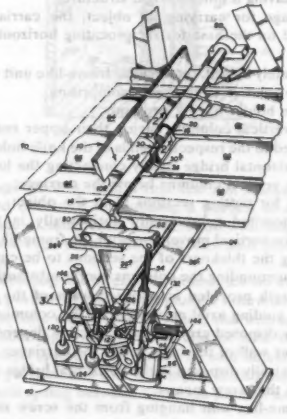
means for mounting said support means and said cutting means for movement relative to each other with said support surface being essentially normal to the axes of said saw blades, said relative movement adapted to be from a first position with the blades of said cutting means aligned along and closely adjacent the edge surface of a said stack of paper on said support means along a predetermined path corresponding to a said predetermined pattern with said blades engaged through the edge portion of the stack of paper to a second position to form a plurality of nonlinear slots in the stack of paper corresponding to the predetermined pattern.

3,975,976

CUTTING APPARATUS WITH ROTATABLE ANVIL

Thomas H. Prentice, 9015 W. 19th Ave., Portland, Oreg. 97219

Filed Nov. 3, 1975, Ser. No. 628,576
Int. Cl.² B26D 1/06; B27L 5/08
U.S. Cl. 83—556 20 Claims



1. In cutting apparatus including a knife mounted for shifting between a cutting and a noncutting position,

an anvil against which said knife may strike when shifted to its cutting position, said anvil including a magnetically attractable element having an arcuate lower surface facing away from said knife and a resilient arcuate striking surface facing generally in the direction of said knife,

support means for said anvil including a cradle in which the lower surface of said element rests and magnet means magnetically attracting said element to hold it in said cradle, and

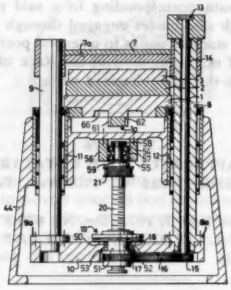
rotator means operatively connected to said anvil operable on actuation to rotate the anvil in said cradle to present different portions of said arcuate striking surface to the knife.

3,975,977

MICROTOME

Gustav Mörnberg, Stockholm, Sweden, assignor to Palmstiernas Mekaniska Verkstad AB, Stockholm, Sweden

Filed Oct. 10, 1974, Ser. No. 513,901
Claims priority, application Sweden, Oct. 19, 1973, 7314262
Int. Cl.² B26D 5/02, 7/06
U.S. Cl. 83—707 6 Claims



1. A microtome, comprising:
a. a base having a unitary, rigid structure;
b. a carriage for carrying an object, the carriage being mounted on the base for reciprocating horizontal movement;
c. a completely closed, rectangular frame-like unit vertically movable relative to the base, comprising
i. a knife holder having two ends;
ii. two vertical columns having their upper ends rigidly secured to the respective ends of the knife holder; and
iii. a horizontal bridge rigidly connecting the lower ends of the vertical columns below the carriage;
d. a knife for cutting sections from the object, the knife being mounted substantially horizontally in the knife holder for vertical movement with the frame-like unit for adjusting the thickness of the sections to be cut;
e. means surrounding the columns over a substantial part of their length provided in opposed walls of the base, for slidably guiding axial movement of the columns;
f. centrally disposed crew means rotatably depending from the upper wall of the base below the carriage;
g. a nut centrally disposed in the horizontal bridge cooperating with the screw means;
h. the frame-like unit hanging from the screw means and being vertically adjustable by the screw means.

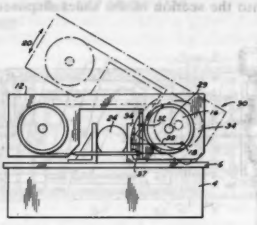
3,975,978

DIRECT COUPLED WAY SYSTEM FOR MOVABLE HEAD BAND SAW MACHINES

Charles E. Cleland, Edina, Minn., assignor to Continental Machines, Inc., Savage, Minn.

Filed May 9, 1975, Ser. No. 576,394
Int. Cl.² B23D 49/04
U.S. Cl. 83—796 17 Claims

1. A direct coupled way system for movable head type band saw machines wherein a cutting band is trained in tension over spaced upstream and dowstream band wheels which are supported by a movable head for moving the cutting band relative to a work piece held in position in the path of the cutting band by an arrangement of support members, the direct coupled way system comprising:
shoe means connected to the work piece support member lying between the work piece and the dowstream band wheel;
leg means connected between said shoe means and said dowstream band wheel such that during cutting operations, the spaced position of said downstrean band wheel



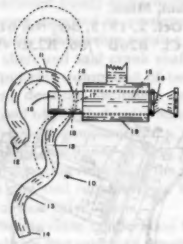
relative to the work piece support member lying between the work piece and the downstream band wheel is maintained.

3,975,979

SERPENTINE LINCH PIN

Leo H. Stoddard, P.O. Box 423, Arab, Ala. 35016

Filed July 30, 1975, Ser. No. 600,227
Int. Cl.² F16B 21/00
U.S. Cl. 85—8.3 4 Claims



1. A linch pin of sturdy rod stock of substantial rigidity and of uniform cross sectional dimension along a major portion of its length; said linch pin having an open-hook shaped head and a serpentine tail extending normally downwardly from said head and adapted to be extended with a close but easily slideable fit through a transverse bore in a related bolt; said hook shaped head being normally engageable loosely within said bore as a means for blocking a member on said bolt against dislodgment from the latter, and said tail being normally clear of said bore, and, by reason of its serpentine shape, serving to oppose sliding of the linch pin from said bore when the linch pin may be in an inverted position.

3,975,980

METHOD AND APPARATUS FOR MANUFACTURING FAIRED ARTICLE

Henry Alexander Hood, Morrestown, N.J., assignor to Wall Industries, Inc., Beverly, N.J.

Continuation-in-part of Ser. No. 499,278, Aug. 21, 1974, abandoned. This application June 4, 1975, Ser. No. 583,653
Int. Cl.² D04C 1/12, 3/12
U.S. Cl. 87—6 17 Claims

1. A method of manufacturing an elongated structure having a core and a plurality of flexible members extending outwardly from the core at spaced intervals along its length, comprising the steps of:
advancing the core axially in a forward direction,
applying a jacket to said core as it advances axially,
laying axially along said core as it advances a portion of an elongated flexible member to form a base for said flexible

members while disposing a first length of said member laterally with respect to said base portion through a guide moveable alongside said core,

displacing said guide with said first length of said flexible member forwardly relative to said moving core and into a limit position beyond said base portion,

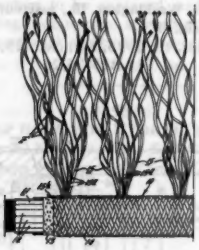
gripping said displaced first length at said forward limit position,

retracting said guide rearwardly while said displaced length is gripped at said limit position to cause a second length of said member to be drawn through said guide and to extend rearwardly from said forward limit position,

causing said first and second lengths to be displaced laterally inward toward said core while maintaining said member gripped at said location to form a said member into a loop extending laterally of the core, and

continuing said jacket-applying step rearwardly of said inwardly-displaced lengths of said member as said core advances to cause the base portion of an axially-adjacent member to be formed, whereby the members are applied to the core in a continuous process.

4. Apparatus for producing a structure having a series of flexible members extending therefrom at spaced intervals along its length, comprising:



means for advancing an elongated core axially in a forward direction,

means moveable in a path about said core to apply a jacket thereto as said core advances,

guide means adapted to slidably receive a flexible member at a location spaced from the core and to define a first length of said member extending away from said core,

means connected to said guide means for reciprocating the same through said path from a home position located rearwardly of said path to limit position located forwardly of said path,

means for gripping said flexible member at said limit position and holding the same while said reciprocating means returns said guide means to its home position for drawing a second length of said member through said guide means, and

means engaging and displacing a rearward portion of said lengths of said member inwardly against said core to form said member into a loop extending away from said core,

whereby the apparatus produces a structure with a series of laterally-extending flexible members each having a base portion fastened securely to the core by the jacket.

3,975,981

SEPARATION SPRING ACTUATOR

Clair F. Seifert, Newport Beach, Calif., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed May 12, 1975, Ser. No. 576,505

Int. Cl.[2] F41F 5/00

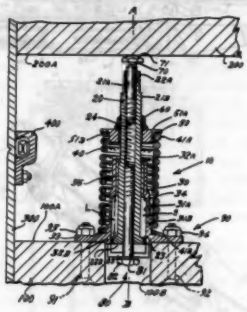
U.S. Cl. 89—1 B **3 Claims**

1. A spring separation actuator, adapted for use in separating a plurality of interconnected bodies, comprising:

a. a center plunger, generally cylindrical in form, having a suitably threaded passageway therethrough, with said center plunger having an external surface, a first end, a second end, and a flange external of said center plunger at said second end;

b. a hollow housing having an internal surface, an external surface, a first end, a second end, an external flange at said second end, and an abutment collar located on said internal surface at a preselected position between said first and second ends of said housing, with said housing disposed surrounding said second end of said center plunger, and with said internal abutment collar essentially oppositely disposed with respect to said center plunger flange, thereby forming and defining an annular space by and with said abutment collar, said internal surface of said housing, said center plunger flange, and said external surface of said center plunger;

c. a cylindrical spring, with a first end and a second end, disposed over and surrounding said external surface of said housing, with said second end abutting with said housing flange;



d. a cage portion, with a first end and a second end, disposed over and surrounding a portion of said external surface of said center plunger, and with said second end of said cage portion abutting with said first end of said spring;

e. an adjusting nut threadably connected on and surrounding a portion of said center plunger intermediate said first and second ends of said plunger, and with said adjusting nut abutting with said first end of said cage portion, thereby capturing said spring by said adjusting nut, said cage portion, and said housing, and also thereby capturing said spring between said cage portion and said housing;

f. a bolt threadably connected to and at said first end of said center plunger;

g. means for drawing said first end of said center plunger toward said first end of said housing, thereby compressing said spring;

h. and, means for attaching said housing to one of said plurality of interconnected bodies.

3,975,982

FIREARM WITH ACCURIZING MEANS

Theodore E. Terstegge, 131 Stillings Ave., San Francisco, Calif. 94131

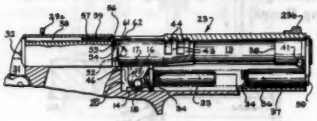
Filed May 31, 1974, Ser. No. 475,056

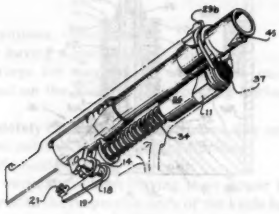
Int. Cl.[3] F41C 3/00

U.S. Cl. 89—163 **6 Claims**

1. In a firearm of a type having a barrel loosely coupled with respect to a frame unit and having a slide member disposed about said barrel and coupled to said frame unit for movement between retracted and advanced positions relative to said unit and said barrel, sights carried by said slide member, accurizing

means for removing lost motion between said barrel and slide member when said slide moves to said advanced position, the last named means comprising a barrel bushing carried between the muzzle end of said slide member and the exterior of said barrel, cam means interposed between said barrel and





said barrel bushing and having portions carried by each to provide camming engagement therebetween as said slide moves toward said advanced position to force said barrel to move in a predetermined direction relative to said slide for removing lost motion between said barrel and said slide.

3,975,983

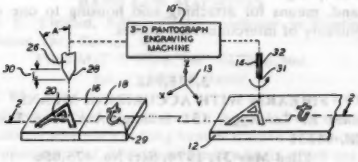
METHOD FOR ENGRAVING GRAPHICAL REPRESENTATIONS UPON WORKABLE MATERIALS

John H. Stockman, 268 Vineyard Point Road, Guilford, Conn. 06437

Continuation-in-part of Ser. No. 473,010, May 24, 1973, Pat. No. 3,915,061. This application Sept. 23, 1975, Ser. No. 615,924

Int. Cl.² B23C 1/16

U.S. Cl. 90—11 C **7 Claims**



1. A method for engraving 3-dimensional graphics upon a work piece, comprising:

positioning at the master object receiving bed of a 3-dimensional pantograph engraving machine, a master wherein analogs of graphics to be engraved are defined by constant width U-cut channels, the center line of said U-channel defining a pattern geometrically similar to the said graphics to be engraved, and the depth of said U-channels being proportional at each point to the width at the surface of said work piece of a said graphic to be engraved;

positioning said work piece at the work piece receiving bed of said machine;

traversing the U-cut channels defining desired graphics with a cylindrical stylus having a diameter approximately that of the said U-cut channel, while maintaining the bottom of said stylus in contact with the bottom of said U-cut channels; and

simultaneously cutting said work piece with a cutting tool moving in 3-dimensions homologously with said stylus; said tool being adapted to sweep a cone during rotation thereof, whereby a graphic is produced on said work piece having a width at the surface thereof and walls sloping to a depth at each point, which width and depth are proportional to the vertical excursions of the stylus during its pass through the U-cut channels of said master; thereby producing a graphic from said analogs having the attributes of a true engraving.

3,975,984

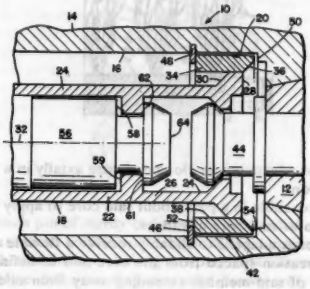
SELF ALIGNING COLLECT FOR MACHINE TOOLS

Gerald P. Simmons, Washington, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Sept. 19, 1975, Ser. No. 615,020

Int. Cl.² B23C 5/26

U.S. Cl. 90—11 D **3 Claims**



1. In a machine tool spindle gripping assembly which comprises a housing with a bore therewithin and a collet slidable toward and retractable from a spindle facing end portion of said bore, said collet having extending from a spindle facing end thereof a plurality of resilient leaves each attached at one end to said collet and separated at a spindle gripping end thereof, each of said leaves having a first annular cam surface adjacent said spindle gripping end thereof, said surface being formed at a selected angle with respect to the longitudinal axis of said collet, the improvement comprising:

a floating collar in said bore adjacent the spindle gripping end of said leaves, said collar having a second annular cam surface at generally the same angle as said first annular cam surface, an inner generally cylindrical surface of said collar urging said spindle gripping ends of said leaves towards one another when said collet is retracted into said bore, an outer generally cylindrical surface of said collar floating clear of the spindle facing end portion of said bore;

means supported by said bore adjacent said spindle facing end portion thereof for stopping said collar from sliding into said bore; and

means for preventing said collar from sliding out of said spindle facing end portion of said bore, the ends of said collar floating clear of said stopping means and said preventing means.

3,975,985

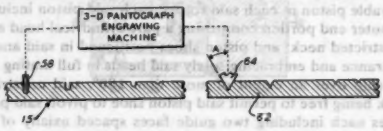
MASTER FOR ENGRAVING GRAPHICAL REPRESENTATIONS UPON WORKABLE MATERIALS

John H. Stockman, 268 Vineyard Point Road, Guilford, Conn. 06437

Division of Ser. No. 615,924, Sept. 23, 1975, which is a continuation-in-part of Ser. No. 473,010, May 24, 1973, Pat. No. 3,915,061. This application Feb. 9, 1976, Ser. No. 656,612

Int. Cl.[2] B23C 1/16

U.S. Cl. 90—62 R 3 Claims



1. A master for use in conjunction with 3-dimensional pantograph engraving machines, said master comprising a plate wherein analogs of graphics to be engraved upon workable stock are defined by constant width U-cut channels, the center line of said U-channel defining a pattern geometrically similar to the said graphics to be engraved, and the depth of said U-channels being proportional at each point to the width at the surface of said work piece of the corresponding graphic to be engraved.

3,975,986

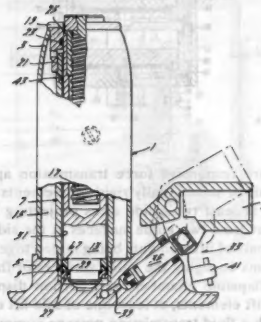
WEEP HOLE FOR HYDRAULIC JACK

Benedict G. Barth, Kenosha, Wis.; Earl G. Willette, Jackson, Mich., and John M. Barosko, Kenosha, Wis., assignors to Tenneco Inc., Racine, Wis.

Filed Feb. 3, 1975, Ser. No. 546,237

Int. Cl.[2] F15B 15/22; F01B 31/20

U.S. Cl. 91—402 3 Claims



1. In a hydraulic ram device having a reservoir, a metal cylinder having a wall and the inside of the cylinder defining a ram chamber, a ram in said chamber having a pressure end and an annular synthetic elastomer packing mounted thereon and sliding on said wall, said wall having a straight ram stroke limiting passage therein extending transversely through the thickness of the wall and opening at an inlet end into said ram chamber, said passage being traversed by said packing during a maximum power stroke of the ram, an outlet end of the passage being open to said reservoir, said passage having a laser produced short small diameter portion terminating in said inlet end and a large diameter portion terminating in said outlet end, said inlet being located adjacent the position occupied by the pressure end of the ram when the ram has moved to substantially the desired termination point for ram travel, said inlet end including an annular corner edge of said small diameter portion of said passage and said edge being characterized by being a smooth, rounded, solidified molten metal shape as a result of said smaller diameter portion being formed by a laser beam directed from the outside toward the inside of the cylinder the pressure end of said ram having a reduced diameter portion forming an annular seat coaxial with the ram and defined by an integral annular radial shoulder formed on the pressure end and in the metal of the ram, said packing being seated on said seat and having an inner diameter normally smaller than the outer diameter of the radial shoulder whereby the packing must be radially enlarged and telescoped over said radial shoulder in order to assemble it on said seat.

3,975,987

DEVICE TO CONTROL A LIFTING CYLINDER

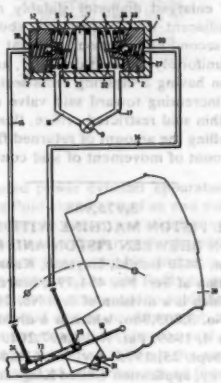
Martinus Johannes Josephus Maria Panis, Tilburg, Netherlands, assignor to Van Doorne's Bedrijfswagenfabriek DAF B.V., Eindhoven, Netherlands

Filed June 7, 1974, Ser. No. 477,499

Claims priority, application Netherlands, July 3, 1973, 7309231

Int. Cl.[2] F15B 11/08, 13/042

U.S. Cl. 91—420 4 Claims



1. In a system for pivotally lifting and lowering a load along a path such that the load moves through a point at which the center of gravity of the load is above the axis of pivotal movement thereof; said system being of the type including a double-acting lifting cylinder connectable to a load, a fluid pump, first and second fluid conduits leading from said pump to first and second chambers of said lifting cylinder for selectively pumping fluid under pressure through one of said fluid conduits into one of said chambers to selectively move said load and for returning fluid from the other of said chambers through the other of said fluid conduits to said pump, and a control device communicating with said first and second fluid conduits for controlling the quantity of fluid returned to said pump; the improvement wherein said control device comprises:

a housing;

a control piston slidably positioned within said housing and defining therewithin a pair of primary chambers;

means for connecting each of said primary chambers to said pump;

means defining a pair of auxiliary chambers within said housing, one each of said auxiliary chambers being connected to one of said first and second fluid conduits;

a pair of restricted orifices respectively connecting one of said primary chambers with a corresponding one of said auxiliary chambers;

a pair of valve means, one each in one of said auxiliary chambers, and means for biasing said valve means to

normally close said restricted orifices when said pump is not operated;

a pair of valve actuator means, separate from said valve means and said control piston, one each mounted within one of said restricted orifices, alternately contactable by said control piston upon movement thereof, for opening a respective of said valve means;

whereby, when said pump supplies fluid under pressure into a first of said primary chambers, said fluid opens a corresponding first said valve means and passes through the corresponding first auxiliary chamber into a corresponding first chamber of said lifting cylinder, and said fluid simultaneously moves said control piston toward a second of said primary chambers, thus contacting the respective second valve actuator means and opening the respective second valve means, thereby allowing fluid from the second chamber of said lifting cylinder to pass through the second auxiliary chamber, said second restricted orifice and said second primary chamber and be returned to said pump;

a pair of compression means, one each positioned in one of said primary chambers, for restricting movement of said control piston proportional to the pressure of fluid supplied by said pump to said first primary chamber; and

each said valve actuator means having a first end portion of uniformly enlarged diameter slidably mounted in said housing adjacent said orifice and abutting said valve means, a second end portion, adjacent said control piston, of a uniformly reduced diameter, and an intermediate portion having a tapering cross-section of a tapered diameter increasing toward said valve means and positioned within said restricted orifice, thus forming means for controlling the amount of returned fluid proportional to the amount of movement of said control piston.

3,975,988

RADIAL PISTON MACHINE WITH PIVOTED CONNECTION BETWEEN PISTON AND PISTON SHOES

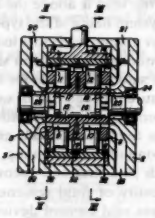
Karl Eickmann, 2420 Isshiki, Hayama, Kanagawa, Japan

Continuation of Ser. No. 454,794, March 26, 1974, abandoned, which is a division of Ser. No. 202,516, Nov. 26, 1971, Pat. No. 3,803,986, which is a division of Ser. No. 830,246, June 4, 1969, Pat. No. 3,697,201. This application Sept. 25, 1975, Ser. No. 616,846

Claims priority, application United Kingdom, Jan. 31, 1968, 4930/68

Int. Cl.² F01B *13/06*

U.S. Cl. 91—492 **10 Claims**



1. In a radial piston machine, a combination comprising a housing including a first pair of planar end faces; rotor means mounted in said housing and including a second pair of planar end faces; end covers at opposite axial ends of said housing and including a third pair of planar end faces inwardly directed and which form with said rotor means and said housing an annular clearance; an axial shaft supported for rotation in bearings in said end covers; said rotor means including a pair of rotors carried by said axial shaft and each having one of the said second pair of planar end faces and each including another planar end face and adapted to abut each other; entraining means for each said rotors for coupling thereof to said axial shaft for rotation therewith but permitting axial movement therealong, said first and third planar end faces, facing and cooperating with said second planar end faces to define said annular clearance thereby coacting with said entraining means to permit said rotors to rotate in unison while permitting said axial movement relative to said shaft, thrust means for said rotors for pressing said rotors in an axially outward direction to obtain close engagement between the facing planar end faces, thereby reducing leakage from between the facing planar end faces while preventing friction therebetween; fluid ports in at least one of said end covers; a radial movable piston in each said rotors, each said piston including an outer end portion comprising a part-cylindrical head and a constricted neck; and piston shoes positioned in said annular clearance and embracing solely said heads in full mating relationship over an extent of more than 180°, said constricted neck being free to permit said piston shoe to pivot; said piston shoes each including two guide faces spaced axially of said rotors and each facing towards one of said end covers, at least one of said guide faces of each piston shoe being guided by said inner face of one of said end covers.

3,975,989

PRESSURE RESPONSIVE FORCE TRANSMISSION APPARATUS

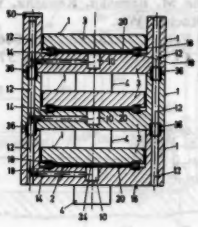
Georg Hirmann, Zurich, Switzerland, assignor to Rudolf Felix Homberger, Schaffhausen, Switzerland

Filed Apr. 4, 1974, Ser. No. 458,008

Claims priority, application Switzerland, Apr. 19, 1973, 5731/73; Feb. 28, 1974, 2821/74

Int. Cl.² F01B *19/02*

U.S. Cl. 92—48 **15 Claims**



1. Pressure responsive force transmission apparatus comprising a pair of substantially rigid lift elements each having a base plate, at least two guide arms projecting from the base plate, and at least two guide surfaces at the sides of the base plate, said pair of lift elements being mated together each with its guide arms engaging the guide surfaces of the other, and a flexible collapsible chamber wall portion disposed between the mated lift elements, at least one of said lift elements being formed with a fluid transmission passage communicating with the collapsible chamber wall portion; the fluid under pressure being delivered through said passage to displace said wall portion and causing the lift elements to move apart.

3,975,990

MIDPLANE PORTING BLOCK FOR AN AXIAL PISTON MACHINE

Peter B. Kraus, Lisbon, N. Dak., assignor to Clark Equipment Company, Buchanan, Mich.

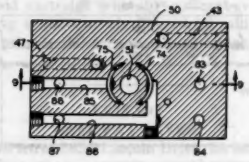
Division of Ser. No. 415,182, Nov. 12, 1973, Pat. No. 3,903,978. This application Jan. 23, 1975, Ser. No. 543,561

Int. Cl.² F01B *13/04*

U.S. Cl. 92—57 **3 Claims**

1. A midplane porting block for a pair of axial piston groups rotatable on a common axis, said block having opposed faces against which the piston groups rotate, a pair of ports in each

of the opposed faces of said porting block, said ports being arcuate and lying on opposite sides of the axis of rotation in each face in fluid communication with portions of said piston groups, and internal passages in said porting block providing fluid communication from said pairs of ports to an exterior surface of the block at spaced locations including first passage



means for each pair of ports which connect one port with said exterior surface by crossing from one side of the axis of rotation to the other, second passage means which connect the other port of each pair of ports for said exterior surface without crossing the axis of rotation and fluid filled conduits connecting said first and second passage means at each spaced location.

3,975,991

HYDRAULIC CYLINDER

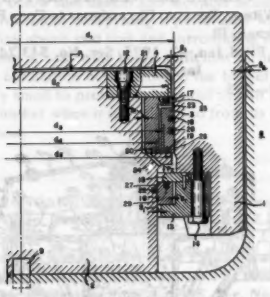
Chugi Nakajima, Yokohama, Japan, assignor to Ishikawajima-Harima Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed July 11, 1974, Ser. No. 487,764

Claims priority, application Japan, July 26, 1973, 48-88667[U]

Int. Cl.² F01B *15/02*; F16J *15/18*

U.S. Cl. 92—117 A **2 Claims**



1. A hydraulic cylinder arrangement of the type having a plunger positioned within a cylinder, the plunger being provided with a seal ring contacting the cylinder and said ring being spaced a slight distance from the plunger to provide a clearance, the invention which comprises a retainer carried by the plunger and contacting the upper surface of said ring, a member extending laterally of the plunger and contacting the lower surface of said ring, a plurality of spaced-apart radial packings carried by said ring and contacting said member, another radial packing carried by the ring and contacting said retainer, an oil passage formed in said seal ring having an upper end opening at the outer side of said ring and a lower end opening at the lower surface of said ring between said radial packings to conduct oil pressure supplied to the plunger and the upper surface of the seal ring to the area of contact between the lower surface of said ring and said member as defined by said spaced-apart radial packings to exert an upward force upon the seal ring.

3,975,992

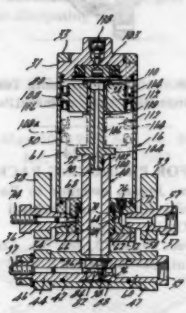
LIFT CONTROL SYSTEM FOR PRESS UNLOADER OR THE LIKE

Harlan R. Cagle, Clarkston, Mich., assignor to Sahlin International, Inc., Birmingham, Mich.

Continuation of Ser. No. 358,917, May 10, 1973, abandoned, which is a division of Ser. No. 147,367, May 27, 1971, Pat. No. 3,732,989. This application Nov. 14, 1974, Ser. No. 524,009

Int. Cl.² F16J *1/12*; F01B *31/00*; F15B *13/042*

U.S. Cl. 92—129 **2 Claims**



1. Fluid operated power cylinder apparatus comprising a cylinder having a fluid chamber and an end wall defining one end of said chamber, a piston rod slidably mounted in and extending beyond said cylinder through said end wall for operative connection to an actuable device, a piston slidably mounted on said piston rod in said fluid chamber, high pressure fluid passage means connected to said fluid chamber on opposite sides of said piston to drive said piston between extended and retracted positions therein, said passage means including a passage extending through the rod and opening into said chamber out of opposite ends of the rod and a pair of separate fluid pressure inlet means located at said end wall and constructed to receive separate pressure fluid conduits separately and independently of each other conducting fluid from a pressure source, one of said fluid inlet means opening into the passage in said rod and including a housing mounted on and movable with the rod and an inlet passage in the housing opening into the passage in the rod, the other of said fluid inlet means being formed in said cylinder and opening into said one end of the chamber adjacent the end wall, connecting means between said piston and said piston rod effective during only a portion of the movement of the piston to provide a time delay operation of said piston rod between extended and retracted positions, said connecting means comprising axially spaced abutment means on said piston rod alternately engageable with opposite sides of said piston, said piston being slidably movable relative to said piston rod between said abutment means to effect the time delay.

3,975,993

PISTON-ROD UNIT FOR HYDRAULIC MACHINES

Ingo Friedrichs, Karlsruhe, Germany, assignor to Commercial Shearing, Inc., Youngstown, Ohio

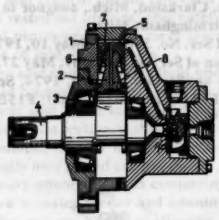
Filed Apr. 22, 1974, Ser. No. 462,650

Int. Cl.² F01B *31/10*; F16J *1/20*

U.S. Cl. 92—129 **7 Claims**

1. In a motor or processing machine having a piston with a socket formed therein operatively contacting a ball formed on one end of a piston rod, to form a ball-and-socket joint with

articulated movement, and a shoe on the other end of said piston rod, adapted to glide on a rotating element of said



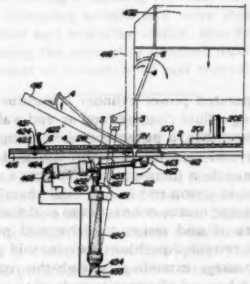
machine, the improvement comprising forming the entire piston rod of a bronze-base bearing metal.

3,975,994

APPARATUS FOR PRODUCING PACKING CASES

Jun Nakane, Chiba, Japan, assignor to Bandamatic System Services Kabushiki Kaisha and Sekisui Jushi Kabushiki Kaisha, both of Osaka, Japan

Filed Dec. 19, 1973, Ser. No. 426,078
Int. Cl.² B31B 1/22, 1/52
U.S. Cl. 93—51 HW **9 Claims**



1. An apparatus for producing a packing case from a sheet of thermoplastic material comprising:

a work table having hinged plates spreadable substantially in the same plane for receiving a plane sheet of thermoplastic material thereon and simultaneously foldable to an upright position for folding said sheet of thermoplastic material into the shape of a case;

a die disposed above said work table and moveable onto said thermoplastic sheet overlying said table in contact therewith for melting, cutting and scoring said sheet, having rectangular heat edges for impressing grooves on said sheet defining a bottom wall of said packing case, straight heat edges for impressing grooves on said sheet for defining side walls and flaps of said packing case, L-shaped heat edges for melting and cutting away corners of said sheet, and flat heat edges for melting portions of the side edges of said side walls whereby said side walls may be secured together so as to form said case when said hinged plates are folded to said upright position;

said hinged plates being provided with guide plates for contacting the edges of said sheet and upraising said flap portions of said sheet while folding said flap portions inwardly and with downwardly sliding means for pressing said flaps after being released from said guide plates onto said melting portions of said side edges of said side walls; and

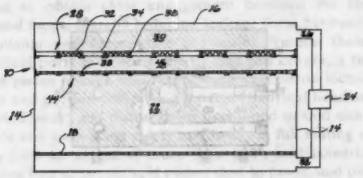
actuator means connected to said hinged plates, said sliding members and said die.

3,975,995

VENTILATED CEILING CONSTRUCTION

Bernard R. Shuler, Louisville, Ky., assignor to American Air Filter Company, Inc., Louisville, Ky.

Filed Mar. 13, 1975, Ser. No. 557,979
Int. Cl.² F24F 7/00
U.S. Cl. 98—40 D **4 Claims**



1. An air filtering and distribution structure for use in an environmentally controlled enclosure, said structure comprising:

a first planar section spaced a predetermined distance from one surface of said enclosure thereby defining a supply air plenum therebetween, said first section comprising a mixed array of air filter panels and blank panels, wherein said filter panels and said blank panels have substantially the same lateral dimensions and are interchangeable; and,

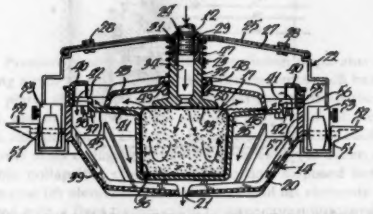
a second planar section spaced a predetermined distance from and generally parallel to said first section thereby defining a clean air plenum therebetween, said second planar section comprising a plurality of perforated air diffusing panels for diffusing and evenly distributing clean air as the clean air passes from said clean air plenum into the enclosure.

3,975,996

COFFEE BREWER APPARATUS

Charles J. Vitous, Berwyn, Ill., assignor to Cory Food Services, Inc., Chicago, Ill.

Filed Jan. 22, 1975, Ser. No. 543,241
Int. Cl.² A47J 31/00
U.S. Cl. 99—295 **16 Claims**



1. In a coffee brewer having a cabinet defining a support wall, a brewing cartridge having a receiver portion defining an upwardly open brewing chamber adapted to receive a sheet filter for supporting loose beverage ingredient and means for mounting the cartridge removably to said support wall, said cartridge having a bottom outlet, and hot water supply means extending through said support wall and having a portion adapted selectively to removably carry any one of a plurality of different hot water deliver elements for delivering hot water into said brewing chamber for contacting beverage ingredients therein, the improvement comprising: a water delivery element removably secured to said supply means portion and having a lower substantially flat surface provided with a through passage for conducting hot water from said supply means downwardly into said brewing chamber for brewing coffee therein; an adaptor removably received in said cham-

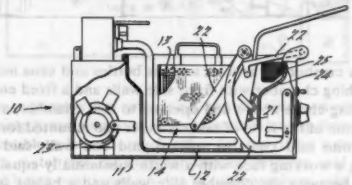
ber and defining an inner brewing chamber substantially smaller than said cartridge brewing chamber for receiving a filter bag enclosing beverage ingredient subjacent said delivery element and defining a first filter; a filter member having a filter portion defining a second filter engaging said adaptor and a mounting portion movably carried by said water delivery element; and means releasably biasing said filter member to cause said filter portion to releasably bear against said adaptor in said cartridge whereby coffee beverage brewed within said bag is successively filtered by said bag and said second filter prior to delivery to said cartridge chamber and bottom outlet.

3,975,997

DEEP FAT FRYER

Carmelo V. DiPietro, 3835 Lincoln Drive, Birmingham, Mich. 48010

Filed Sept. 17, 1975, Ser. No. 614,121
Int. Cl.² A47J 37/12
U.S. Cl. 99—407 6 Claims



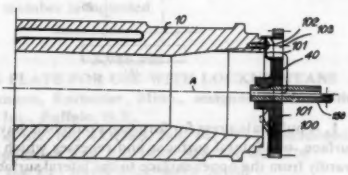
1. In combination with a deep frying vessel, an open mesh food basket movable between a cooking position in which the food within the basket is immersed in shortening held by the vessel and a drain above the vessel, and an impervious particle collecting tray below said basket and movable in unison therewith, the improvement comprising a perforated wall secured to and extending above said tray and surrounding said basket, the perforations in said wall being sufficient in number and size to permit circulation of oil between the basket and vessel but sufficiently small to prevent substantial exit of food particles from the basket when it is being lifted from its cooking to its drain position.

3,975,998

PANCAKE MAKING MACHINE

Paul Marrie, Dijon, France, assignor to S.A.R.L. "ETUD", Quetigny, France

Continuation of Ser. No. 461,109, April 15, 1974, abandoned, which is a division of Ser. No. 241,309, April 5, 1972, Pat. No. 3,853,045. This application June 3, 1975, Ser. No. 583,263
Claims priority, application France, Apr. 7, 1971, 71.12242; July 5, 1971, 71.24434; Feb. 25, 1972, 72.06409
Int. Cl.² A47J 37/06; A21B 5/00
U.S. Cl. 99—423 1 Claim



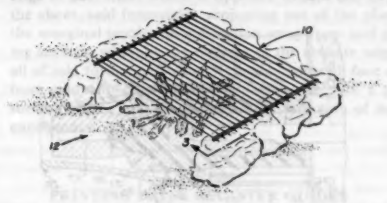
1. In a pancake making machine comprising a trough adapted to receive a supply of batter, a drum rotatable adjacent said trough and formed with a continuous cylindrical peripheral surface except for an axially extending recess, a rotatable transfer roller with access to the batter in said trough closely juxtaposed with said drum, means for rotating said roller and said drum for transferring batter from said trough to said drum, means for heating said drum and baking the batter thereon, and scraper means downstream from said roller in the direction of drum rotation for removing the baked batter from said drum, the improvement wherein said drum is provided at least on one end with a drive gear comprising a metallic base plate fixed to said drum and a heat-resistant synthetic-resin gear wheel formed thereon and having teeth, said base plate being formed as a spider secured at angularly spaced bumps to said drum, said drive gear being formed with throughgoing heat-dissipating holes.

3,975,999

PORTABLE OUTDOOR GRILL

Stephen C. Carroll, 47 Lowergate Court, Owings Mills, Md. 21117

Filed May 30, 1975, Ser. No. 582,123
Int. Cl.² A47J 37/07
U.S. Cl. 99—449 4 Claims



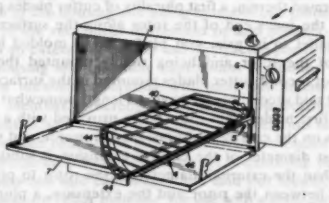
1. A portable outdoor grill, comprising, a plurality of pairs of parallel spaced metal rods, inner connector means for connecting together the ends of succeeding pairs of said metal rods, each inner connector means being provided with a stop at opposite ends thereof, outer connector means for connecting together the ends of two succeeding pairs of said rods, each outer connector means being provided with an element at opposite ends thereof for engagement with its respective stop to hold said rods in a flat, rigid position when said grill is in operational use, the elements and stops being releasable to allow said grill to be rolled up into substantially a cylindrical configuration for compact storage when not in operational use.

3,976,000

ROTATABLE AND VERTICALLY ADJUSTABLE RACK

Berton R. Oxel, Louisville, Ohio, assignor to The Hoover Company, North Canton, Ohio

Filed Feb. 27, 1975, Ser. No. 553,517
Int. Cl.² F24C 15/16
U.S. Cl. 99—446 6 Claims



1. A rack adjustment mechanism for a cabinet having a plurality of walls defining a chamber, the combination comprising a vertically disposed threaded member mounted for

rotation with respect to said cabinet, a rotatable member mounted with respect to said cabinet to impart at least limited rotation to said threaded member, an object supporting rack carried by said threaded member for disposition within said chamber, said rack frictionally cooperating with said threaded member whereby rotation of said threaded member frictionally imparts rotation to said rack to horizontally displace an object supported by said rack with respect to said chamber, and said rack cooperates with a wall of said chamber to limit rotation of said rack whereby further rotation of said threaded member causes said rack to engage said wall to limit rotation of said rack and overcome the frictional cooperation between said rack and said threaded member to cause vertical shifting of said rack along the axis of said threaded member to vary the vertical position of an object supported by said rack with respect to said chamber.

3,976,001

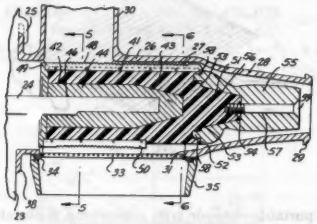
POWER JUICER

Harry R. Trovinger, 1051 N. Lincoln Ave., Lodi, Calif. 95240

Filed July 9, 1973, Ser. No. 377,413

Int. Cl.² A23N *1/00*; B04B *5/10*

U.S. Cl. 99—513 **1 Claim**



1. As a new article of manufacture, a power juicer embodying a body having a hollow formation, an electric motor detachably connected to said body, a motor shaft projecting into said body, a hopper mounted on said body, there being an opening on the underside of said body and said opening having a generally rectangular formation, a screen of semicylindrical formation for covering said opening, said screen including a rectangular frame surrounding said opening, a spout detachably affixed to said body and underlying said opening, a pair of shoulders on said spout engaging said frame, a nozzle integrally formed on the end of the body opposite said motor and said nozzle having a conical taper, a rotor of generally cylindrical formation mounted on said shaft within said hollow body, said rotor having an axial bore that terminates in a socket of generally conical formation, a bushing of generally cylindrical formation provided with a conical extension at one end thereof that is seated in the bore in said rotor, said bushing being provided with a bore for receiving the shaft of the motor, a plurality of semicylindrical recesses formed in the outer circumference of said rotor and extending from substantially midway of the length thereof to the end having the conical socket formed therein, a first plurality of cutter blades projecting from the inner end of the rotor along the surface of the rotor parallel to its axis, said blades being molded into the surface of the rotor and being rigidly mounted therein, a plurality of second cutter blades mounted in the surface of the rotor and said second blades having a length somewhat shorter than the first blades, said rotor being provided with a conical extension on the end thereof opposite the motor, and wherein the largest diameter of the conical extension is substantially smaller than the external diameter of the rotor to provide a shoulder between the rotor and the extension, a plurality of bores opening inwardly of said last named shoulder and projecting parallel to the axis of the rotor, said extension having a threaded axial bore formed therein, a screw threaded unloading attachment embodying a pulp unloading auger having a conical socket for engaging over the conical extension, there being an axial bore extending from the conical socket through the outer end of the unloading auger, said auger having screw thread lands formed thereon, and a plurality of pins on the inner end of the auger engaging in the bores for preventing relative rotation between the auger and said rotor.

3,976,002

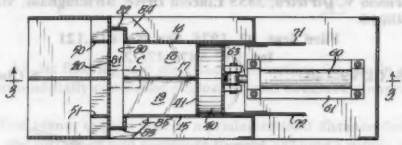
CAN AND BOTTLE CRUSHER

Hans W. Gerlach, Greenfield, Wis., assignor to Summit Metal Fabricating, Inc., Cudahy, Wis.

Filed Feb. 6, 1975, Ser. No. 547,554

Int. Cl.² B30B *15/30*

U.S. Cl. 100—215 **2 Claims**



1. A crusher for articles such as bottles and cans including a crushing chamber with fixed side walls and a fixed end wall, a loading chute above and opening to said chamber, a crushing piston at the level of said chamber and mounted for movement into said chamber toward said end wall, said piston having a working face with a width substantially equal to the space between the chamber side walls and a height substantially equal to the height of said crushing chamber and a rectangular top plate extending rearwardly from the top of said working face for closing off said loading chute as the piston advances to prevent articles falling behind the piston, said chamber having a bottom opening adjacent said chamber end wall for gravity drop of crushed articles, and said fixed side walls being at an increased distance apart adjacent said end wall throughout the entire height of the crushing chamber and above said bottom opening to define an expansion section of the chamber to free the crushed articles for said gravity drop.

3,976,003

PULP BALE PRESS FOR FORMING A BALE

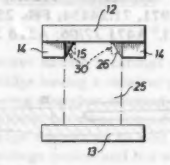
Bo Lennart Henning Larsson, Karlstad, Sweden, assignor to Sunds Aktiebolag, Sundsvall, Sweden

Filed July 29, 1974, Ser. No. 492,749

Claims priority, application Sweden, Aug. 9, 1973, 7310896

Int. Cl.² B30B *15/06*

U.S. Cl. 100—295 **4 Claims**



1. A pulp bale press for forming a pulp bale having an upper surface, two lateral surfaces and recesses which slope downwardly from the upper surface to the lateral surfaces, comprising:

a. a first press table; and

b. a second press table, said first and second press tables forming the bale between said tables, said first table having a surface facing said second press table and in-

cluding protrusions for forming the recesses, said protrusions each including a portion extending into a space between said first and second tables accommodating the bale, and having a substantially flat central part sloping outwardly from said surface of said first table to one side of said space and extending sideways in the direction of the edges of said first table.

3,976,004

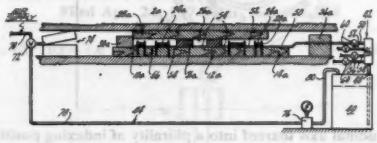
APPARATUS FOR METAL RULE DIE EMBOSSING AND STAINING

John W. England, III, 1101 Mountain Road - Apt. 8, and Jeffery E. Wright, Plantation East - Apt. 3, both of Martinsville, Va. 24112

Continuation of Ser. No. 317,812, Dec. 22, 1972, abandoned. This application May 30, 1974, Ser. No. 474,310

Int. Cl.² B44B *5/02;* **B41F** *31/08*

U.S. Cl. 101—26 **4 Claims**



1. An apparatus for embossing and staining a stockpiece comprising press means; said press means having two members movable relative to each other for providing a pressing action; a metal rule die member located between said members and being positioned on one of said members; said metal rule die member having a metal rule extending therefrom towards the other of said members and forming a desired design with an enclosed area therein; said metal rule having an edge which is sharp for embossing a stockpiece; absorbent means for receiving a stain being located in the enclosed area of said metal rule; said absorbent means having an exposed surface recessed from the sharp edge of the metal rule into said enclosed area; means for placing a liquid stain in contact with said absorbent means including a supply of liquid stain, tube means connecting the interior of said enclosed area with said supply of liquid stain, means for forcing the liquid stain through said tube means to said enclosed area, valve means operatively connected with said tube means for controlling the flow of liquid stain from said supply to said enclosed area; means for properly positioning a stockpiece between said metal rule die member and the other movable member of said press means in relation to said metal rule; means for controlling the depth of cut of said sharp edge of the metal rule into a stockpiece to a desired depth when embossing, one of the two members of said press means being a cylinder, said metal rule die member being cylindrical and being mounted on said cylinder, said means for positioning a stockpiece comprising a sliding means for sliding a stockpiece between one member of the press means and the cylindrical metal rule die member, said means for controlling the cut of said sharp edge of the metal rule into a stockpiece to a desired depth for embossing including two downwardly extending movable arms on which said cylinder member is mounted.

3,976,005

PRINTING PLATE FOR USE WITH LOCKUP MEANS

Harold Kaufmann, Rochester, Minn., assignor to Houdaille Industries, Inc., Buffalo, N.Y.

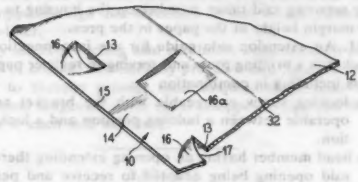
Continuation of Ser. No. 433,398, Jan. 14, 1974, abandoned. This application Aug. 25, 1975, Ser. No. 607,374

Int. Cl.² B41N *1/04;* **B41F** *27/00*

U.S. Cl. 101—395 **4 Claims**

1. A printing plate adapted to be tensionably mounted on and rotated by a press roll by means of a lock-up means, said plate comprising:

a. A sheet of flexible material including at least a layer of metal, said sheet having a surface capable of serving as a printing surface, there being a plurality of aligned straight slits lying in a marginal planar portion along one edge of said sheet for being disposed parallel to the rotational axis of the press roll, parts of said marginal portion lying between each said slit and said edge of the sheet being indented drawn formations of single thickness integral throughout their peripheries with said marginal portion



other than at an arcuate edge of the formation facing the edge of said sheet which is opposite to said one edge of the sheet, said formations projecting out of the plane of the marginal portion in a direction away from said printing surface, whereby the entirety of the arcuate edges of all of said formations which define said slits all face away from said one edge for abutting edgewise with a plane surface on the lock-up means in the direction of its circumference.

3,976,006

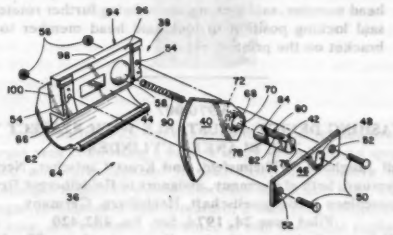
PRINTING PRESS REGISTER GUIDES

Giuseppe Re Baratelli, Via Saronno 3, Milan, Italy (20154)

Filed Mar. 18, 1974, Ser. No. 451,815

Int. Cl.² B41F *1/34*

U.S. Cl. 101—414 **13 Claims**



2. In a drop away guide having a housing for use in a printing press, the improvement comprising: a biased elongated plunger member extending from said housing for rectilinear sliding movement into and out of the housing, slot means on said elongated plunger member, a retractable member mounted in the housing and being movable in a plane perpendicular to the rectilinear movement of said plunger member between an extended position and a retracted position relative to the housing and including cam means positioned thereon, said cam means cooperating with said slot means on said plunger member, whereby rectilinear reciprocating sliding movement of said elongated plunger member into said housing moves said retractable member from the extended position to the retracted position by virtue of a camming action effected between said cam means and said slot means.

8. A snap-on raiser member, for use with a drop away register guide housing mounted to a printing press, the housing defining a pair of end walls adapted to receive and hold said raiser member and having an offset member extending out-

wardly from one of said end walls and along the length thereof of the housing, said raiser member including a main body portion, two depending resilient legs at opposite ends of said main body and extending perpendicularly thereto, inwardly directed and oppositely disposed tongues at the extremities of each of said legs such that upon attachment of said raiser member onto the housing, one of said tongues on one of said depending legs being engageable with one of said end walls of the housing and the other of said tongues on the other of said depending legs being engageable with the opposite one of said end walls of the drop away register guide housing for detachably securing said raiser member on the housing to maintain the margin height of the paper in the press.

11. An extension side guide for use in connection with a bracket in a printing press and serving to register paper in the press including in combination

a locking screw engageable with the bracket and being operable between a holding position and a locking position,

a head member having an opening extending therethrough said opening being adapted to receive and permit said locking screw to be operable between said holding position and said locking position to lock said head member to the bracket in the printing press, said opening further having a dimension that accommodates limited lateral movement of said head member relative to said locking screw;

a threaded bore in said head member having an axis extending generally transversely to said locking screw;

an adjustment screw threadedly cooperating within the bore for longitudinal movement relative thereto, and

a spring disposed between said adjustment screw and said head member, whereby said locking screw is inserted through said opening in said head member to hold said head member to the bracket on the printing press, the rotational movement of said adjustment screw provides for engagement with said locking screw when said locking screw is in said holding position and said head member is laterally moved and finely positioned on the bracket and said spring is compressed thereby preventing vibrational movement of said adjustment screw with respect to said head member, said locking screw being further rotated to said locking position to lock said head member to the bracket on the printing press.

3,976,007

WASHING DEVICE ADJUSTABLE WITH RESPECT TO THE BLANKET CYLINDER

Rudi Junghans, Wilhelmsfeld, and Ernst Czotscher, Neckargemund, both of Germany, assignors to Heidelberger Druckmaschinen Aktiengesellschaft, Heidelberg, Germany

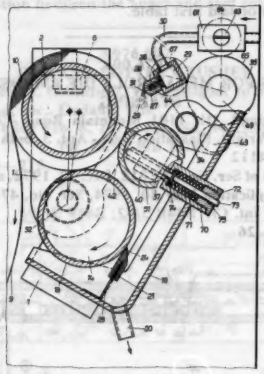
Filed June 24, 1974, Ser. No. 482,420

Claims priority, application Germany, June 22, 1973, 2331645

Int. Cl.² B41F *35/06*

U.S. Cl. 101—425 **2 Claims**

1. In a washing device for an offset printing press having a blanket cylinder, the washing device being adjustable with respect to the blanket cylinder and including a rotary washing roller having a soft covering and being in frictional driving engagement with and traversible relative to the blanket cylinder, means for wetting the washing roller with wash solution, a collecting vessel underlying the washing roller, a doctor roller having a firm surface located in continuous frictional engagement with the washing roller, a doctor blade abutting the firm surface of the doctor roller for guiding therefrom into the collecting vessel ink washed off the blanket cylinder with the wash solution, and a distributor roller having a firm surface engaging the soft covering of the washing roller at a location behind the doctor roller in the rotary direction of the washing roller, the distributor roller being wettable with fresh wash solution; the means for wetting the washing roller with wash solution comprising a drip tube mounted above the distributor roller and extending along substantially the entire length thereof, said drip tube having a plurality of nozzles formed with nozzle openings, indexing means operatively connected to said drip tube for pivoting said tube about the



longitudinal axis thereof into a plurality of indexing positions, and valve means similarly adjustable by said indexing means for regulating flow of the wash solution to the distributor roller in accordance with the respective indexing position of said drip tube.

3,976,008

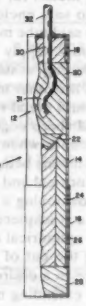
PYROTECHNIC SEEDING PELLET

Samuel Altschuler, Tarzana, Calif.; Frank T. Traylor, Bartlesville, Okla.; Richard W. Ziemer, Woodland Hills, and Charles A. Knight, Beverly Hills, both of Calif., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Feb. 19, 1975, Ser. No. 551,433

Int. Cl.² F42B *4/02*

U.S. Cl. 102—31 **1 Claim**



1. A pyrotechnic seeding pellet disposed for ejection from a space or reentry vehicle into the atmosphere for releasing a predetermined number of ions and electrons therein, said pellet comprising:

a. a housing:

b. pyrotechnic means carried in said housing, said pyrotechnic means including a striker mix, a match ignition mix, a pickup charge, a delay column, and an output charge arranged in serial relation in said housing, said output charge disposed for release of ions and electrons responsive to ignition thereof, said output charge consisting of a mixture of boron nitrate and finely divided aluminum-

magnesium alloy in a 50–50 ratio and having cesium blended therein; and,

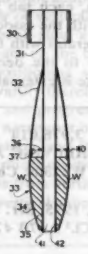
c. means for igniting said pyrotechnic including a lanyard coated with red phosphorous and having a first end thereof embedded in said striker ignition mix, the second end of said lanyard extending out of said housing in secured relation with said vehicle, whereby responsive to ejection of said pellet from said vehicle said lanyard is pulled through said striker ignition mix and the force of friction between said lanyard and striker ignition mix causes said striker ignition mix to ignite for subsequent ignition of said match ignition mix and said pickup charge.

3,976,009

COMPOSITE CAST STRUCTURE AND PROCESS FOR MANUFACTURE OF SAME

Manuel M. Delgado, and Paul A. Delgado, both of 12624 Ocaso, La Mirada, Calif. 90638

Filed Apr. 24, 1974, Ser. No. 463,534
Int. Cl.² F42B 25/18
U.S. Cl. 102—7.6 10 Claims



1. A composite cast projectile comprising an outer shell of sheet metal formed to conform with the required exterior shape of the finished projectile nose portion;

a tube extending through the shell and second thereto at one end thereof;

said tube and shell defining an internal cavity having a closed bottom;

at least one opening through said shell or tube communicating with said cavity;

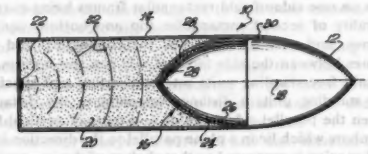
cast metal substantially filling said cavity and in cast in place engagement with the walls of said shell and tube defining said cavity.

3,976,010

SPIN COMPENSATED LINER FOR SHAPED CHARGE AMMUNITION AND METHOD OF MAKING SAME

Louis Zernow, Glendora, Calif., assignor to Whittaker Corporation, Los Angeles, Calif.

Filed Apr. 16, 1973, Ser. No. 351,292
Int. Cl.² F42B 13/10, 1/02
U.S. Cl. 102—56 SC 9 Claims



1. A method of forming a spin compensating, shaped-charge liner, comprising the steps of:

forming a pair of hollow, conical sub-liners sized to coaxially mate together;

inserting one said sub-liner within the other said sub-liner to form a hollow, conical, shaped-charge liner having a longitudinal axis;

fixedly interconnecting said sub-liners adjacent one pair of ends thereof to lock said one pair of ends against rotation relative to each other;

rotationally twisting said sub-liners in opposite directions about said longitudinal axis about said one pair of ends to provide each said sub-liner with a tangential shear stress of opposite sign and direction to that in the other said sub-liner;

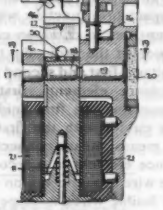
fixedly interconnecting said sub-liners adjacent their other pair of ends to substantially preserve said opposite twisting to thereby provide said shaped-charge liner with residual tangential shear stress of opposite sign and direction in each said sub-liner.

3,976,011

INERTIAL ARMING DEVICE FOR A FUSE

Charles Crescas, East Meadow; Sorrell Weisman, Jackson Heights, and Joseph Sharf, Valley Stream, all of N.Y., assignors to Bulova Watch Company, Inc., New York, N.Y.

Filed Oct. 31, 1960, Ser. No. 67,151
Int. Cl.² F42C 11/00, 15/00
U.S. Cl. 102—70.2 R 4 Claims



1. A fuse suitable for use in a body to be accelerated toward a target area comprising a base, a solenoid including a spring-biased armature disposed in said base, an explosive train including in sequence a detonator disposed in said base, a lead plunger contained in said armature, a lead plug contained in said base, and a booster contained in said base, said explosive train being initially out of alignment by reason of the position of the lead contained in said armature, a powerweight linearly movable from a first position to a second position in response to acceleration of said body, said powerweight being in interlocking engagement with said armature when said powerweight is in said first position and said armature is in a position governed solely by the urging of its bias spring, an escapement connected to said powerweight through a gear train to govern the movement of said powerweight from said first position to said second position, a spring-biased fork member responsive to the position of said powerweight, said fork member being biased against said powerweight and serving to engage said armature as it is moved under the influence of said solenoid when said powerweight is in said first position, the movement of said powerweight to said second position permitting said fork member to move out of the path of said armature and into engagement with said powerweight in its second position to serve as a support therefor, such that said explosive train becomes aligned upon movement of the armature out of interlocking relationship with said powerweight, followed sequentially by movement of said powerweight from said first posi-

tion to said second position, movement of said fork member out of the path of said armature, and movement of said armature whereby said explosive train is aligned and the fuse is armed.

3,976,012

ARRANGEMENT FOR AUTOMATIC SWITCHING IN ELECTRIC FUSES FOR PROJECTILES

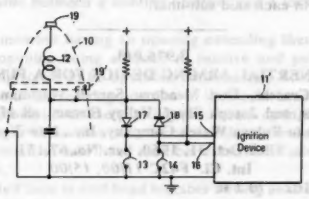
John Lennart Nordgren, Jarfalla, Sweden, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 21, 1974, Ser. No. 471,968

Claims priority, application Sweden, May 21, 1973, 7307112

Int. Cl.² F42C 11/00, 17/00

U.S. Cl. 102—70.2 R 11 Claims



1. In an electric ignition device for a projectile including a number of ignition circuits controlling electric igniters for initiating at least three different functions including a proximity fuse function, an impact fuse function with instantaneous effect, and an impact fuse function with delayed effect, the improvement comprising, a common contact means accessible from the outside of the projectile to receive an external function select voltage, first and second unidirectional current conducting impedance elements, first and second fusible wires, means connecting the first unidirectional impedance element in series circuit with the first fusible wire to said common contact means, means connecting the second unidirectional impedance element in a second series circuit with the second fusible wire to said common contact means, means coupling the two fusible wires to respective ones of the said ignition circuits so that if a fusible wire is intact the associated ignition circuit is active and if the fusible wire is melted the ignition circuit is inactivated, a switchable voltage generating device past which the projectiles are transported so that an output contact on the voltage generator contacts said common contact means on the projectile to apply thereto said function select voltage whereby in dependence upon a switch setting of the voltage generating device selective melting of the fusible wires can be achieved for setting the ignition device to a desired function.

3,976,013

SHEET METAL PALLET

William H. Woodford, 206 Stephenson Court, Sheffield, Ala. 35660

Filed May 1, 1975, Ser. No. 573,402

Int. Cl.² B65D 19/28

U.S. Cl. 108—56.3 5 Claims

1. A sheet metal pallet, which comprises:

a runner having a pair of integrally connected opposed sidewalls, each sidewall having a flange which depends laterally from the uppermost portion thereof, the flanges being in substantially coplanar relation; and

a substantially planar deck having a set of brackets and a set of tabs, the runner being positioned against the underside of the deck with the flanges thereof and the underside of the deck in abutting relation, the set of brackets including a bracket for each flange, each bracket being displaced downwardly from the deck and integrally connected therewith, each bracket having a laterally oriented surface portion and a substantially vertically oriented surface portion, the laterally oriented surface portion being connected to the deck by the substantially vertically oriented surface portion, the laterally oriented surface portion being positioned immediately below the underside of the associated flange, whereby the set of brackets

cooperates with the flanges to fix the runner to the deck, the set of tabs including a tab for each sidewall, each tab being displaced downwardly from the deck and integrally connected therewith, each tab having a lower edge in proximate contact with the associated sidewall, whereby the set of tabs cooperates with the sidewalls to substantially resist, relative to the deck, displacement of the runner when a torque is externally applied thereto.

3,976,014

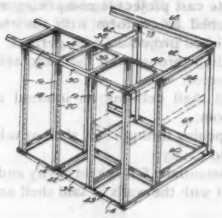
MODULAR SHELVING APPARATUS

Clifford S. Brown, N76 W22300 Cherry Hill Road, Sussex, Wis. 53089

Filed Mar. 3, 1975, Ser. No. 554,852

Int. Cl.² A47B 47/02

U.S. Cl. 108—64 7 Claims

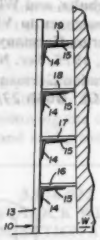


1. A shelving construction comprising a plurality of preassembled free-standing units each of said units including first rectangular top and bottom frames having vertically extending side faces, vertical framing members having upper and lower ends connected to said first frames proximate each of the corners thereof and located inwardly of the external periphery of said first and second frames, each of said vertical framing members including a front face and two opposed side faces, the corresponding faces of pairs of said vertical framing members on one side of said rectangular frames being parrallel; a plurality of second rectangular top and bottom connecting frames, and connecting means for connecting said second frames between the side faces of said top and bottom frames of said free-standing units interconnecting and spacing said free-standing units a distance common to the distance between the parallel side faces of said pairs of vertical framing members which lie in a plane parallel to the direction in which said spacing is measured so that shelves of the same width will fit between the free-standing units and within the free-standing units and provide an integral assembly of a plurality of shelf receiving units.

3,976,015
FREE STANDING SHELF UNIT

Paul L. Mc Murray, 7495 Salinas Trail, Youngstown, Ohio 44512

Filed June 4, 1975, Ser. No. 583,848
Int. Cl.² A47B 57/00
U.S. Cl. 108—92 4 Claims

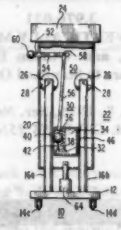


1. A free standing shelf unit adapted to lean on a wall and comprising at least a pair of vertical supports, each of which has a front side and a back side, a plurality of horizontally disposed shelves and means on the back sides of said vertical supports holding and positioning said shelves in vertically spaced relation and outwardly therefrom, each of said shelves being of uniform length and progressively narrower in width than the others with the narrowest of said shelves being positioned in uppermost position and the widest of said shelves being positioned in lowermost position, whereby said vertical supports stand at an angle from vertical when the edges of the shelves opposite to the vertical supports are engaged against said wall.

3,976,016
OVERBED TABLE WITH LOCKING MECHANISM

John Douglas Longbottom, Haddonfield, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Dec. 23, 1974, Ser. No. 535,811
Int. Cl.² A47B 9/08
U.S. Cl. 108—144 4 Claims

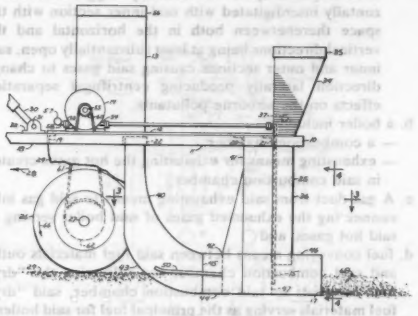


1. A table adjustable to different heights comprising in combination:
a base member;
a table member slideably coupled to said base member for movement toward and away therefrom;
one of said base member and table member having two spaced apart parallel guides for guiding the other;
a cam member moveably connected to the other of said table member and said base member and in sliding contact with one of said parallel guides; and
a roller member interposed between said cam member and the other of said parallel guides, the interaction of said roller member and said cam member causing an interference between said cam member and said one of said parallel guides simultaneously with an interference between said roller member and the other of said parallel guides when said table member is attempted to be moved toward said base member.

3,976,017
LEGUMINOUS PLANT INOCULATION PROCESS AND APPARATUS

William A. Leffler, Jr., deceased, late of 421 Virginia Ave., Sanford, Fla. 32771, by Mary W. Leffler, Administratrix

Filed July 29, 1974, Ser. No. 492,581
Int. Cl.² A01C 23/02
U.S. Cl. 111—1 3 Claims

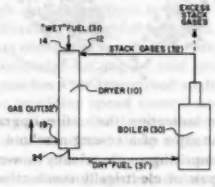


1. The improved method of inoculating a leguminous plant with viable nitrogen fixing bacteria comprising mixing viable bacteria as derived from a predetermined source with potable water to produce a fluid aqueous dispersion of the viable bacteria, opening a seed furrow in soil to be used for growth of the plant, simultaneously delivering the fluid aqueous dispersion and a legume productive of the plant into the open seed furrow to thereby infuse the soil in the furrow beneath the delivered legume with the viable bacteria, and thereafter immediately covering the infused soil and delivered legume with soil to thereby shield the infused soil from sunlight.

3,976,018
DRYER SYSTEM

William Paul Boulet, 4945 St. Roch Ave., New Orleans, La. 70122

Filed Feb. 14, 1975, Ser. No. 549,945
Int. Cl.² F23G 5/04
U.S. Cl. 110—10 10 Claims



1. A fuel dryer and boiler system comprising:
a. a fuel dryer including
— an elongated, at least generally vertically disposed hot gas/materials interaction drying chamber;
— a gas inlet at one end of said chamber and a gas outlet at the other end of said chamber, hot gases being conducted through the length of said chamber from said gas inlet to said gas outlet in at least generally uniform, evenly distributed, non-vortex flow;
— a solid "wet" fuel material inlet at the upper end of said chamber and a solid "dry" fuel material outlet at the other, lower end of said chamber, said solid fuel

material moving down through said chamber from said material inlet to said material outlet at least partially under the influence of gravity, said hot gases and said solid fuel material intermixing together in said chamber, drying said solid fuel material; and

— lateral projection means mounted within said chamber extending partially across said chamber for causing a positive forced filtering effect of said gases flowing through said material to remove airborne pollutants by causing cross flow of said material and said gases as they move through said chamber, said lateral projection means comprising an inner section and an outer section spaced apart and vertically staggered and horizontally interdigitated with said inner section with the space therebetween both in the horizontal and the vertical directions being at least substantially open, said inner and outer sections causing said gases to change direction laterally producing centrifugal separation effects on the airborne pollutants;

b. a boiler including

— a combustion chamber;

— exhausting means for exhausting the hot gases created in said combustion chamber;

c. A gas duct from said exhausting means to said gas inlet connecting the exhausted gases of said boiler serving as said hot gases; and

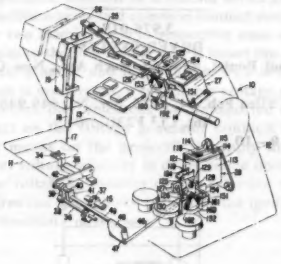
d. fuel conveying means between said fuel materials outlet and said combustion chamber for delivering the "dry" fuel materials to said combustion chamber, said "dry" fuel materials serving as the principal fuel for said boiler.

3,976,019

POSITION SENSING DEVICE FOR SEWING INSTRUMENTALITY ACTUATOR

John Wesley Allen, Hudson, and William P. Waiwood, Parma, both of Ohio, assignors to The Singer Company, New York, N.Y.

Filed Oct. 30, 1974, Ser. No. 519,374
Int. Cl.² D05B *3/02, 19/00*
U.S. Cl. 112—158 E **7 Claims**



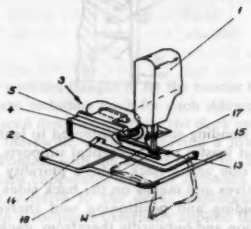
1. A device for indicating the entire operating range of positions of the actuator of a sewing machine stitch forming instrumentality comprising an electrically non-conductive coil carrying plate, a pair of electrically conductive coils carried on said coil carrying plate in spaced relation and each having a form which is substantially the mirror image of the other coil about an imaginary line midway therebetween, means electrically interconnecting one terminal of each of said coils, a shunt plate for affecting the inductance of said coils, said shunt and coil carrying plates being relatively shiftable, said shunt plate being supported in spaced relation to said coils and having only one position, symmetrical about said imaginary line midway between said coils, in which said shunt plate bears substantially identical physical relationship to each of said coils, an actuator for a sewing machine stitch forming instrumentality, means connected to said actuator for influencing relative shift of said shunt and coil carrying plates varying the inductance in said coils, and an electrical circuit including said coils and responding to the differences in inductance between said coils due to the positioning of said shunt plate to said coils for producing a signal varying in a substantially linear fashion over the operating range of positions of said actuator.

3,976,020

SEWING MACHINE AND IRONING DEVICE

Gunter Aulich; Dieter Schultz, and Wilhelm Rosel, all of Wittenberge, Germany, assignors to VEB Nahmaschinenwerk Wittenberge, Wittenberge, Germany

Filed May 9, 1975, Ser. No. 575,911
Claims priority, application Germany, May 20, 1974, 178601
Int. Cl.² D05B *27/00*
U.S. Cl. 112—217 **6 Claims**



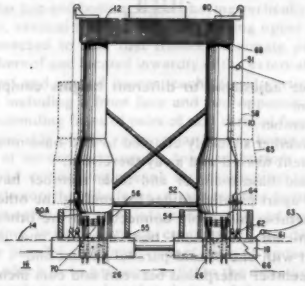
1. Apparatus for sewing and ironing a seam comprising sewing means for forming a seam in fabric presented thereto, ironing means and means defining a path for fabric to be sewed and ironed, said ironing means comprising a first ironing element disposed on one side of said path, mens mounting said first ironing element for movement towards said path, a second ironing element on the opposite side of said path, said first element cooperating with said second element to iron material therebetween and electro-magnetic means effective to urge said first element towards said second element to apply ironing pressure to fabric therebetween, wherein said electromagnetic means comprises a core and coil means mounted on said second ironing el .ment and wherein said first ironing element is constituted as an armature cooperating with said core and coil means.

3,976,021

INSTALLATION OF VERTICALLY MOORED PLATFORM

Kenneth A. Blenkarn, and William D. Greenfield, both of Tulsa, Okla., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed Sept. 8, 1975, Ser. No. 611,286
Int. Cl.² B63B *35/44*
U.S. Cl. 61—89 **10 Claims**



1. A method of installing a floating structure over a location on the floor of a water-covered area in which the floating

structure is anchored only by essentially parallel and vertical members under tension, which comprises:

a. positioning said structure and a gravity base over said location;

b. lowering said gravity base from said floating structure with cables to said floor while maintaining said floating structure in a positive buoyancy state;

c. after said gravity base is in engagement with said floor, lowering riser pipes and securing the lower ends to a fixed position with respect to said ocean bottom;

d. securing the upper ends of said riser pipes to said floating structure; and

e. placing said riser pipes under tension and removing the tension from said cables so that said cables can be removed and then removing the cables from between said floating structure and said gravity base.

3,976,022

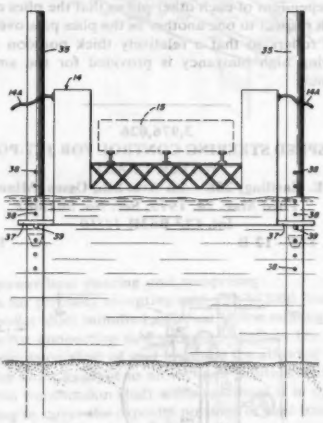
FLOATING DRY DOCK WITH BUOYANCY CONTROLLED AIR INJECTION AND VENTING SYSTEM

Pierre A. Lapeyre, P.O. Box 430, Houma, La. 70360

Filed Feb. 3, 1975, Ser. No. 546,790

Int. Cl.² B63C *1/02*

U.S. Cl. 114—45 **1 Claim**



1. A floating dry dock with buoyancy control for use with a landside marine yard railway comprising an open bottom U-shaped multi-compartment dock longer and wider than the vessel to be transferred to the marine yard railway, low pressure air lines connected to the top of the leg of the U-shape of each open bottomed compartment, compressor means connected to supply air to said low pressure air lines, control means in each air line to regulate air flow to and from each compartment to trim the dock for alignment with the marine yard railway for transfer of a boat in said dock to the marine railway, a plurality of vertical guide means having openings along their length along which said dry dock moves between a flooded down condition and a buoyant vessel transfer condition, guide plates carried by the bottom of said dock having openings therethrough through which said vertical guide means pass, and locking pins receivable through the openings along said vertical guide means positioned to be engaged by said plates to support the dock and vessel during transfer of a vessel from the dock to the marine railway to permit shutdown of the compressor without disturbing the trim of the dry dock.

3,976,023

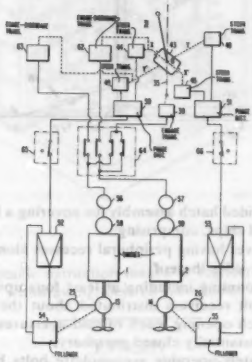
APPARATUS FOR MANEUVERING A SHIP

Tadamasa Noguchi, Kawasaki; Masao Matsuura, Agee, and Senzou Ehata, Tokyo, all of Japan, assignors to Niigata Engineering Co., Ltd., Tokyo, Japan

Filed Jan. 29, 1975, Ser. No. 545,076

Int. Cl.² B63H *25/24*

U.S. Cl. 114—144 E **5 Claims**

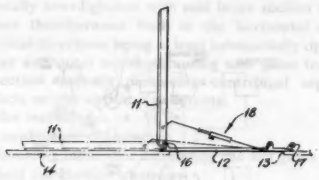


1. In an apparatus for maneuvering a ship having left and right Z type propellers, including a maneuvering handle set on a bridge of the ship, a first transmitting means having transmitters for said left and right propellers, each of said transmitters being responsive to said handle for providing a signal to switch between going ahead and astern, a second transmitting means having second transmitters for said left and right propellers, each of said second transmitters being responsive to said handle for providing a signal to steer the ship, means connected through servo amplifiers to phase discriminators for changing the direction of said left and right propellers respectively, followers connected to said servo amplifiers for discontinuing the horizontal turning of said propellers when the turning angle reaches a predetermined angle in said apparatus, and means for providing speed control and clutch engaging and disengaging signals, the improvement comprising; said handle adapted to be inclined at any angle and in any direction about the center of said handle, said first transmitting means adapted to issue a control signal so as to revolve said propellers equally in the opposite direction in accordance with the travel distance of said handle with respect to one of two cross axes through the center of said handle, said second transmitting means adapted to issue a control signal so as to revolve said propellers equally in the same direction in accordance with the travel distance of said handle with respect to another of the two cross axes, said maneuvering handle comprising a control rod having lower end forked and bent at right angle to provide two arms; a quadrilateral frame having two opposing sides respectively carrying transmitters adapted to be actuated by said arms, and another two opposing sides respectively carrying second arms for actuating second transmitters; and a shell carrying said second transmitters.

3,976,024
BOAT HATCHES WITH DUAL ESPAGNOLETTE BOLTS FOR HINGING AND LOCKING

Gordon Thomas Fillery, Cannes, France, assignor to Crest Nicholson Limited, England

Filed May 20, 1975, Ser. No. 579,250
Claims priority, application United Kingdom, June 4, 1974, 24598/74
Int. Cl.² B63B *19/14*; E05D *15/50*
U.S. Cl. 114—203 6 Claims



1. A four-sided hatch assembly for covering a hatch opening for boats and ships, comprising:

a hatch cover having peripheral recesses along at least two opposite sides thereof;

a hatch mounting including at least four upstanding apertured bolt receivers distributed about the periphery of said hatch opening, each of said apertures having an at least substantially closed periphery;

two separately-operable espagnolette bolts housed one in each of said two hatch cover recesses and disposed parallel to one another, said espagnolette bolts both serving the dual functions of positively fastening said hatch cover to said hatch mounting and of hinging said hatch cover thereto, said espagnolette bolts each including a pair of arms, each arm having a remote free end selectively engageable with at least one of said bolt receiver apertures, the engaged arms being positively retained in their associated apertures when engaged therewith to permit pivotal movement of an engaged pair of arms of one espagnolette bolt in their associated apertures when the arms of the other espagnolette bolt are disengaged from their associated apertures but to substantially prevent relative displacement between said engaged arms and their associated bolt receivers in a direction perpendicular to the longitudinal axis of the respective arms; and

operating means coupled to said espagnolette bolts and operable from both inside and outside the hatch for extending or retracting said remote ends of each of said espagnolette bolts to selectively engage and disengage said arm ends from said bolt receiver apertures;

said upstanding apertured bolt receivers being positioned to enter said hatch cover recesses to cooperate with said espagnolette bolts, and said apertured bolt receivers being upstanding an amount sufficient to permit substantially 180° movement of the hatch cover thereabout when the arm ends of an espagnolette bolt are engaged in their respective bolt receiver apertures;

whereby

a. when both espagnolette bolts are extended into their associated bolt receivers, said hatch cover is locked in a closed position,

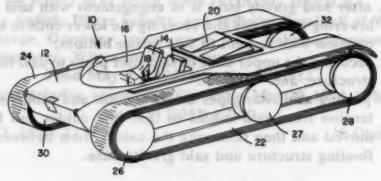
b. when a selected one only of said bolts is retracted from its associated bolt receivers, said hatch cover is pivotally and positively secured to said hatch mounting to be swung open about a hinge axis defined by the other espagnolette bolt, and

c. when both of said espagnolette bolts are retracted from their bolt receivers, said hatch cover is freed for detachment from said hatch mounting.

3,976,025
AMPHIBIOUS VEHICLE

Raymond Sidney Russell, P.O. Box 191, Norway, Maine 04268

Filed June 24, 1974, Ser. No. 482,712
Int. Cl.² B60F *3/00*
U.S. Cl. 115—1 R 7 Claims



3. A buoyant pontoon assembly for an amphibious vehicle, said pontoon assembly comprising:

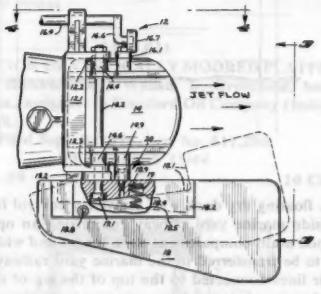
at least two tandemly mounted rollers;

a plurality of circumferentially superimposed plies of buoyant material mounted on said rollers, each said ply having a narrower width than the next outermost ply, each said ply except the outermost ply having a pair of tabs on the opposite sides of the outer surface thereof to provide a groove so that the next outermost ply fits into said groove and is confined between the tabs, each said ply being independent of each other ply so that the plies can creep with respect to one another as the plies pass over each of the rollers so that a relatively thick pontoon assembly having high buoyancy is provided for the amphibious vehicle.

3,976,026
SLOW SPEED STEERING CONTROL FOR JET-POWERED WATER CRAFT

George E. Eastling, 258 - 4th Ave. SE., Osseo, Minn. 55369

Filed Mar. 24, 1975, Ser. No. 561,082
Int. Cl.² B63H *11/10*
U.S. Cl. 115—12 R 11 Claims



1. In a water craft having a jet power unit with a steering control orienting the direction of jet flow from the unit toward one side or the other of the craft to steer the craft,

a slow-speed steering device comprising a steering plate; a mounting plate mounting the steering plate to the power unit with the steering plate in a substantially vertical plane; means moving the steering plate in unison with movement of the steering control to maintain the steering plate substantially parallel to the jet flow from the jet power unit; the mounting plate and steering plate having pairs of cooperating surfaces permitting the steering plate to be deflected upwardly from a normal running position when an obstruction or the like is encountered, one pair

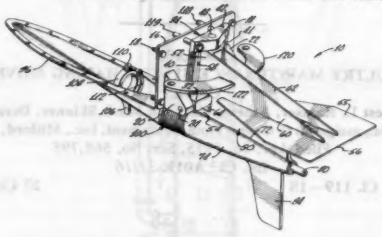
of cooperating surfaces being engageable to limit the upward deflection movement of the steering plate and the other pair of surfaces being engageable to define the normal, running position of the steering plate, the mounting plate including a spring urging the steering plate into its normal position.

3,976,027

STRUT DRIVE MECHANISM

Ronald O. Jones, Sr., Santa Ana, Calif., assignor to Ron Jones Marine Engineering, Inc., Tacoma, Wash.

Filed May 23, 1974, Ser. No. 472,640
Int. Cl.² B63H *5/12*
U.S. Cl. 115—35 **6 Claims**



4. A power boat steering unit comprising:
means for pivotally mounting said unit to said boat;
a propeller shaft mounted adjacent said mounting means;
means for connecting said propeller shaft in line with the transmission shaft of said boat and for allowing said propeller shaft to pivot to an inclined position with respect to the transmission shaft while said boat is in operation;
a fairing to cover the exposed portions of said transmission shaft extending below said boat; and
an inlet port extending below said fairing to receive water as said boat moves forward.

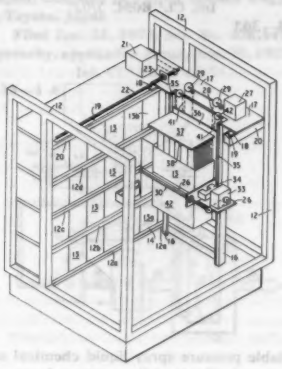
3,976,028

AUTOMATIC ARTICLE IMMERSION APPARATUS

Francis Thomas Howells, Alresford, and John Maldwyn Newman, Andover, both of England, assignors to Newman-Howells Associates Limited, London, England

Filed Jan. 17, 1975, Ser. No. 541,991
Claims priority, application United Kingdom, Jan. 30, 1974, 4307/74
Int. Cl.² B05C *3/02*
U.S. Cl. 118—6 **14 Claims**

1. Automatic article immersion apparatus comprising a stationary stack of receptacles; an article holder; receptacle extraction means, including a timing device, for automatically moving receptacles out of said stack; holder moving means, including a timing device, for automatically advancing said holder towards and, after a predetermined time, withdrawing it from a receptacle moved out of the stack whereby an article carried by the holder may be immersed, for a predetermined time in a fluid carried by said receptacle; and means for moving the receptacle extraction means to register with, and be operative for withdrawing, desired receptacles in turn.

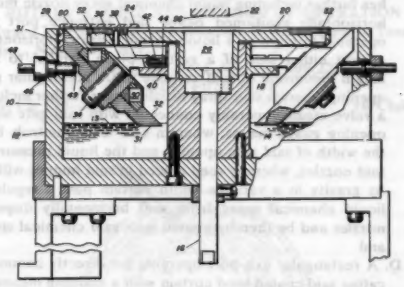


3,976,029

LIQUID ADHESIVE APPLICATOR

George Rosner, Newport, R.I., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sept. 17, 1975, Ser. No. 614,713
Int. Cl.² B05C *1/02, 7/00*
U.S. Cl. 118—215 **6 Claims**



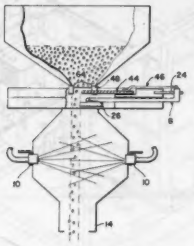
1. A device for applying a film of liquid adhesive to the inside lip surface of a cylindrical cap, which comprises:
a vessel containing said liquid adhesive;
a knurled wheel rotatably and resiliently mounted in said vessel adapted to contact said inside cap lip surface and said liquid;
means for rotating said cap, whereby rotation of said cap causes the knurled wheel in resilient contact therewith to rotate and thereby apply said liquid to said lip surface; and
magnetic means for rotating said knurled wheel when said wheel is not rotated by rotation of said cap.

3,976,030

PORTABLE PRESSURE SPRAY LIQUID SEED TREATER

Philip W. Ragsdale, 142 Ridge Road, Little Rock, Ark. 72207, and Sidney M. Stephens, 5611 Big Oak Lane, Little Rock, Ark. 72209

Filed Oct. 6, 1975, Ser. No. 620,662
Int. Cl.² B05C 5/02
U.S. Cl. 118—303 5 Claims



1. A portable pressure spray liquid chemical seed treater comprising a vertically extending support frame, defining an open upper end and a bottom external mounting means, and further comprising:

A. An upwardly open hopper positioned proximate said open upper end of said frame, said hopper further including a horizontally disposed rectangular bottom opening having a length elongate with respect to its width; and

B. An adjustable gate assembly below and upwardly communicating with said rectangular opening, said gate assembly further comprising a horizontally slideable gate member operable to define a variable open dimension to said width of said rectangular bottom opening wherein said gate assembly further includes a gate operating lever, and said lever further includes a gate width opening guage means; and

C. A liquid chemical seed treating chamber having an upper entrance port below and upwardly communicating with said variable width rectangular gate opening, said chamber further including liquid chemical spray nozzle means horizontally positioned below said entrance port and operable to impinge a liquid chemical spray horizontally against either side of a vertical plane parallel to said length dimension of said variable width rectangular gate opening wherein said spray nozzle means further includes a valve means, operably connected with said gate width opening guage means, wherein said lever controls both the width of said gate opening and the liquid pressure to said nozzles, whereby seed placed in said hopper will fall by gravity in a variable width curtain past a regulated liquid chemical spray from said horizontally disposed nozzles and be thereby coated with said chemical spray; and

D. A rectangular exit port operable for directly communicating said coated seed curtain with a planting means for said seed.

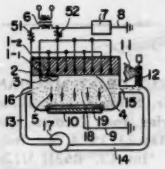
3,976,031

ELECTRIC DISCHARGE COATING APPARATUS

Tsutomu Itoh, Tokyo, Japan, assignor to Onoda Cement Company, Ltd., Japan

Filed July 7, 1975, Ser. No. 593,722
Claims priority, application Japan, July 10, 1974, 49-078226
Int. Cl.² B05B 5/02, 7/14
U.S. Cl. 118—629 16 Claims

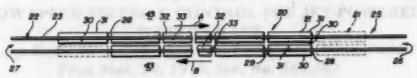
1. An electric discharge coating apparatus for powder coating a substrate comprising a face-silent discharge electrode disposed to be separated from and to confront said substrate, means for introducing a powder coating material into a space between said face-silent discharge electrode and said substrate, power supply means coupled to said face-silent discharge electrode for impressing an AC voltage to cause a silent discharge on a surface of said face-silent discharge electrode, and means for impressing a voltage between said substrate and said face-silent discharge electrode.



3,976,032

POULTRY MAINTENANCE SYSTEM HAVING MOVING CAGES

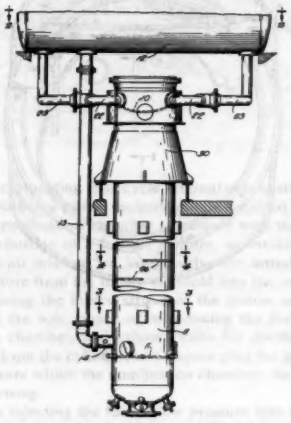
Forrest L. Ramser, Athens, Ga., and Mark Skinner, Decatur, Ala., assignors to Chore-Time Equipment, Inc., Milford, Ind.

Filed Apr. 16, 1975, Ser. No. 568,795
Int. Cl.² A01K 31/16
U.S. Cl. 119—18 27 Claims

20. Apparatus for maintaining poultry and the like, comprising at least one elongated bi-compartmented poultry cage each compartment being further divided into a plurality of stalls, first transport means, a plurality of separate cage trucks for carrying the cage along the transport means in a first path direction with a first cage end leading and a second cage end following, a first cage compartment being carried along an inside of the apparatus and a second outer cage compartment being carried along an outside of the apparatus, when the cage moves along the first transport means and second transport means located closer to the first transport means than the length of the cage for moving the cage trucks and cage along a second path direction compactly adjacent to but opposite the first path direction with the first cage end following and the second cage end leading, the first cage compartment being carried along the outside of the apparatus and the second cage side being carried along the inside of the apparatus when the cage moves along the second transport means including first cage transfer means for transferring the cage from the first transport means to the second transport means along a straight path without reversing the orientation of the cage, and second cage transfer means for transferring the cage from the second transport means to the first transport means along a straight path without reversing the orientation of the cage, whereby the cage is moved about the apparatus in a non-revolving pattern, each transfer means including means for receiving said cage from one of said transport means, and means for moving said cage-receiving means between alignment with said first transport means and alignment with said second transport means for delivering said cage to the other transport means.

3,976,033
VERTICAL FIRETUBE WASTE HEAT BOILER

Denis G. Csathy; Wendell L. Y. Hung, both of Minneapolis, and Jon M. Heath, New Brighton, all of Minn., assignors to Deltak Corporation, Minneapolis, Minn.

Filed July 30, 1975, Ser. No. 600,438
Int. Cl.² F22B *1/18, 9/04*
U.S. Cl. 122—7 R 5 Claims



1. A boiler having vertical firetubes, upper and lower sheets to which the opposite ends of the firetubes are connected, an upright substantially cylindrical shell surrounding the firetubes in radially spaced relation to all of them and joined to the peripheral edges of the tube sheets to coact with the tube sheets in defining an upright closed vessel, and means including a downcomer outside the vessel for communicating the top and bottom of the vessel so that during operation of the boiler the vessel contents flow upwardly, said boiler being characterized by:

A. the upper tube sheet having its peripheral edge at a level substantially above its central portion, and being upwardly inclined outwardly from its central portion along every radius to induce radially outward flow of the vessel contents along the underside of the upper tube sheet;

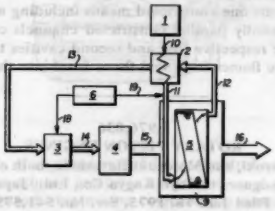
B. an annular baffle projecting radially inward from the shell at a level below the junction of the shell with the upper tube sheet to direct the upwardly flowing vessel contents towards the axis of the vessel and against the center of the upper tube sheet to assure a positive radially outward flow of the vessel contents across the underside of the upper tube sheet that wipes away any steam bubbles in contact therewith; and

C. the shell having circumferentially spaced outlets closely adjacent to and above the peripheral edge of the upper tube sheet through which the steam-water mixture constituting the contents of the vessel leaves the same.

3,976,034
METHOD FOR PRODUCING A COMBUSTIBLE GAS BY PARTIAL OXIDATION FOR USE IN INTERNAL COMBUSTION ENGINES

Hiroshi Shinohara, Okazaki; Kunihiko Masunaga, Toyota; Toshihito Kondo, Toyota, and Kazuhiko Ishiguro, Toyota, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Jan. 25, 1974, Ser. No. 436,449
Claims priority, application Japan, Jan. 30, 1973, 48-12200
Int. Cl.² F02B *43/04*
U.S. Cl. 123—1 A 9 Claims

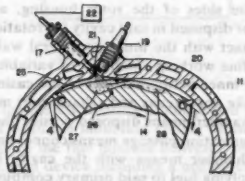


1. A method of operating an internal combustion engine with a combustible gas, which comprises the steps of: transforming a refined product of crude oil into a combustible gas characterized by a composition comprising 10% – 70% hydrogen, 20% – 75% carbon monoxide, 5 – 60% methane, 0 – 5% carbon dioxide, and up to 20% dry hydrocarbon gases in a generator by admitting said refined product into said gas generator with 60 – 120% of the stoichiometric volume of oxygen needed to oxidize said refined product under the partial oxidation conditions of 400°~800°C with a space velocity ranging from 5000 ~ 50,000 V/VC × hr^{-1}; passing the combustible gas produced to an internal combustion engine to start and operate said internal combustion engine; and discharging the exhaust gases from said internal combustion engine.

3,976,035
ROTARY ENGINE AND METHOD OF OPERATION

Edward Mitchell, Hopewell Junction, N.Y., assignor to Texaco Inc., New York, N.Y.

Filed Sept. 26, 1974, Ser. No. 509,373
Int. Cl.² F02B *53/10*
U.S. Cl. 123—8.09 10 Claims



1. In a rotary piston engine including a casing having a chamber defined by trochoidal inner surfaces, with closure walls at opposite ends thereof, a rotary piston having peripheral faces bordered by spaced apart apices and being journalled to permit a planetary motion thereto whereby said apices slidably engage said trochoidal surface during the sequential injection, compression and combustion of a chargein the engine combustion chamber,

a depressed segment of said rotor peripheral face having a compound combustion chamber formed therein including first and second longitudinally spaced apart cavities,

inlet means in said casing positioned to introduce an air charge into said compound combustion chamber during the engine intake period,

a fuel nozzle carried in said casing and positioned to introduce a stream of fuel toward said first cavity to form an enriched air-fuel mixture therein,

spark means positioned in said casing to spark ignite the combustible portion of said enriched fuel mixture whereby to form a flame front, and

at least one constricted means formed into said peripheral face intermediate the respective first and second cavities for directing discrete flames from said flame front into the second cavity for flame igniting the lean fuel charge established therein,

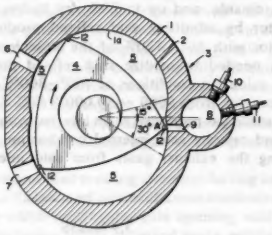
said at least one constricted means including a plurality of substantially parallel constricted channels communicating the respective first and second cavities to guide said discrete flames from said flame front into the latter.

3,976,036

ROTARY PISTON ENGINES

Takumi Muroki, and Motoyuki Hayashida, both of Hiroshima, Japan, assignors to Toyo Kogyo Co., Ltd., Japan

Filed Jan. 16, 1975, Ser. No. 541,575
Claims priority, application Japan, Jan. 25, 1974, 49/11335
Int. Cl.² F02B *53/10*
U.S. Cl. 123—8.09 **5 Claims**



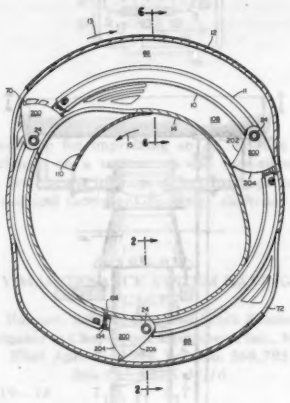
1. A rotary piston type internal combustion engine comprising a casing which includes a rotor housing having cavity defined by a trochoidal inner peripheral wall having a major and a minor axis, and a pair of side housings sealingly secured to the opposite sides of the rotor housing, a substantially polygonal rotor disposed in said cavity for rotation with apices in sliding contact with the inner peripheral wall of the rotor housing to define working chambers of variable volume with the trochoidal inner peripheral wall of the casing, said casing having air intake port means and exhaust port means, primary combustion chamber means disposed outside the cavity in the casing, communication passage means connecting the primary combustion chamber means with the cavity in the casing, means for supplying fuel to said primary combustion chamber means, and ignition means provided in said primary combustion chamber means, said primary combustion chamber means having a volume which is 35 to 65 percent of the sum of volume of the primary combustion chamber and that of one of the working chambers in the most compressed position, said communication passage opening to the casing cavity at a position between 15° before and 30° after the minor axis of the rotor housing, said fuel supply means being adapted to provide air-fuel mixture having air-fuel ratio of 10 to 16 in the primary combustion chamber and overall air-fuel ratio of 19 to 46 in the primary combustion chamber and the working chamber communicating therewith.

3,976,037

ROTARY ENGINE

Edward J. Hojnowski, 112 Lagana Ave., Plantsville, Conn. 06479

Filed Sept. 20, 1974, Ser. No. 507,932
Int. Cl.² F02B *53/00*
U.S. Cl. 123—8.25 **12 Claims**



1. A rotary engine comprising an annular stator having circumaxially spaced valve openings, a hollow shaft rotatably received inside said stator and defining at least one compression cavity between said shaft and said stator, an outer rotor rotatably received outside said stator and defining at least one expansion cavity between said rotor and said stator, means for rotatably interconnecting said shaft and rotor for rotation in opposite directions, a generally triangular valve element in each of said valve openings and having three apexes, a projecting flange at one of said apexes defining an inner sealing surface engaging said shaft, a projecting flange at a second apex of said valve element defining an outer sealing surface for engaging said rotor, and an arcuate convex corner at a third apex of said valve element and cooperating with a concave end of said valve opening in said fixed stator to define a pivot axis for said valve element adjacent one end of said valve opening whereby the valve element oscillates in the plane defined by said three apexes and in response to said oppositely rotating shaft and rotor, and each valve element further including a free side portion between said inner and outer first and second apexes respectively, said free side portion being spaced circumaxially from the end of said valve opening opposite said one end whereby the compressed charge formed in said compression cavity moves radially outwardly into said expansion cavity as said shaft and rotor oscillate said valve element, said stator having inner and outer recesses adjacent said opposite end of said valve opening for receiving said projecting flanges at the inner and outer limits of travel for said valve element in said opening, and said triangular valve element including an inner side portion between said third apex associated with said pivot axis and said inner apex associated with said inner sealing surface, said inner side portion of said valve element having a slightly concave contour to mate with the generally cylindrical contour of said hollow shaft.

3,976,038

RECIPROCATING STRATIFIED CHARGE INTERNAL COMBUSTION ENGINE AND MIXTURE FORMATION PROCESS

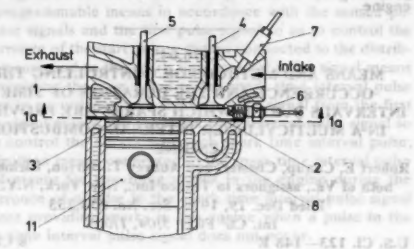
Günter Stahl, Gartenstrasse 17, 7910 Neu-Ulm, Germany

Filed Mar. 22, 1973, Ser. No. 343,696

Claims priority, application Germany, Mar. 24, 1972, 2214400; May 5, 1972, 2222029; Dec. 7, 1972, 2259888

Int. Cl.² F02B *19/10, 19/16*

U.S. Cl. 123—32 SP **14 Claims**



1. In a reciprocating four-cycle internal combustion engine having a cylinder, a piston reciprocatingly received within the cylinder, a combustion chamber associated with the cylinder for the combustion of a fuel-air mixture, an intake manifold for the fuel-air mixture, an intake valve for introducing the fuel-air mixture from the intake manifold into the combustion chamber during the intake stroke of the piston, said intake valve being the sole means of introducing the fuel into the combustion chamber, and exhaust valve for discharging exhaust gases from the cylinder, and a spark plug for igniting the fuel-air mixture within the combustion chamber, the improvement comprising:

means for injecting the fuel at low pressure into the intake manifold immediately upstream of the intake valve, said low pressure fuel injecting means being operative to commence fuel flow to the intake manifold no sooner than commencement of the second half of the intake stroke of the piston and to terminate said fuel flow prior to or upon termination of the intake stroke;

means defining an intake section in the combustion chamber, the spark plug and the intake valve being located closely adjacent to one another and being encompassed by said intake section;

means defining an exhaust section in the combustion chamber spaced from the intake section, said exhaust valve being located in said exhaust section; and

means defining a passage in the combustion chamber of restricted cross section relative to the cross section of the intake section coupling the intake section and the exhaust section, whereby upon induction of the fuel-air mixture into the intake section a stratified charge is established in the entire combustion chamber.

3,976,039

INTERNAL COMBUSTION ENGINE WITH STRATIFIED CHARGE

Claude Henault, Chevilly-Larue, France, assignor to Regie Nationale des Usines Renault and Societe dite: Automobiles Peugeot, both of Paris, France

Filed July 5, 1974, Ser. No. 486,230

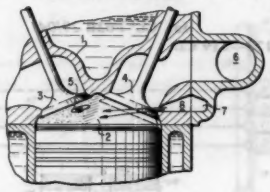
Claims priority, application France, June 6, 1973, 73.24939

Int. Cl.² F02B *19/10, 19/18*

U.S. Cl. 123—32 ST **12 Claims**

1. An internal combustion engine with stratified charge and controlled ignition comprising:

at least one combustion chamber for receiving a rich fuel mixture, and means for admitting a rich fuel mixture to said combustion chamber, means for introducing a quantity of air into the upper region of the combustion chamber opposite the ignition region which is also disposed within the upper region of the combustion chamber said means for introducing said quantity introducing said



quantity of air at the end of the intake stroke whereby the air is introduced just prior to ignition,

said air introducing means comprising a passage opening into the exhaust duct close to the opening orifice of the exhaust valve.

3,976,040

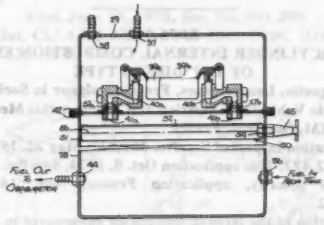
APPARATUS AND METHOD FOR MIXING AND DISPERSING ENGINE DRAINAGE INTO THE FUEL FLOW TO AN ENGINE

Charles P. Goggi, Staten Island, N.Y., assignor to Goggi Corporation, Staten Island, N.Y.

Filed Aug. 1, 1974, Ser. No. 493,902

Int. Cl.² F02B *33/06*

U.S. Cl. 123—73 AD **9 Claims**



1. In a device for distributing drainage and the condensed vapor thereof from the induction system of an internal combustion engine to the fuel mixture delivered by a fuel system to the engine, said device including a mixing chamber having an inlet and an outlet passage, said mixing chamber being adapted to be connected in series with the fuel system, a drainage chamber adapted to receive drainage from the engine, means providing passage for drainage from said drainage chamber to the upper portion of said mixing chamber, the improvement of which comprises diffuser plate means located directly below said drainage passage means at a fixed elevation in the upper end of said mixing chamber, said diffuser plate means having an upper surface for receiving the drainage flowing from said passage means and dispersing said drainage in a thin film which descends from the periphery of the diffuser plate means, whereby said drainage mixes readily with the fuel in said mixing chamber.

3,976,041
SUPERCHARGED WATER COOLED INTERNAL COMBUSTION ENGINE

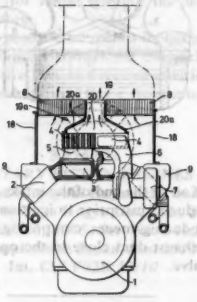
Hermann Mettig, Rodenkirchen, and Bernhard Medenus, Bensberg-Lustheide, both of Germany, assignors to Klockner-Humboldt-Deutz Aktiengesellschaft, Cologne, Germany

Filed Aug. 28, 1974, Ser. No. 501,214

Claims priority, application Germany, Aug. 28, 1973, 2343300

Int. Cl.² F02B *29/04*

U.S. Cl. 123—119 CD **2 Claims**



1. A water cooled internal combustion engine having a central axis which includes in combination: a cooling blower arranged at one end face of said engine, at least one water cooler extending alongside said engine and operatively connected to said cooling blower to be actuated thereby, a supercharger air cooler arranged underneath said water cooler and in parallel alignment with the central axis of said engine, and means for directing the cooling air delivered by said cooling blower so that said cooling air flows through said supercharger air cooler and extending parallel to the path of the air to be discharged from said water cooler.

3,976,042
MULTICYLINDER INTERNAL COMBUSTION ENGINE OF THE DIESEL TYPE

Yves Baguelin, Louveciennes, France, assignor to Societe Anonyme de Vehicules Industriels et d'Equipements Mecaniques SAVIEM, Suresnes, France

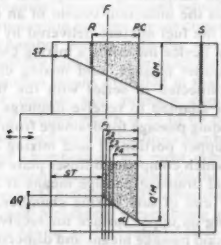
Continuation-in-part of Ser. No. 362,837, May 22, 1973, Pat. No. 3,902,472. This application Oct. 8, 1974, Ser. No. 513,270

Claims priority, application France, Nov. 14, 1973, 73.40552

The portion of the term of this patent subsequent to Sept. 2, 1992, has been disclaimed.

Int. Cl.² F02M *39/00*

U.S. Cl. 123—139 AR **3 Claims**



1. A diesel engine comprising: a set of starting cylinders and a set of power cylinders; an injection pump including two sets of plunger pistons, one said set of plunger pistons being associated with the starting cylinders for supplying fuel to the starting cylinders and the other set of plunger pistons being associated with the power cylinders for supplying fuel to the power cylinders; and common rack means for engaging and rotating said plunger pistons; the pistons of said one set of the injection pump each having an injection profile appropriate for supplying fuel to the starting cylinders for starting the engine and the pistons of said other set of the injection pump each having an injection profile appropriate for supplying fuel to the power cylinders for normal to full load operation of the engine.

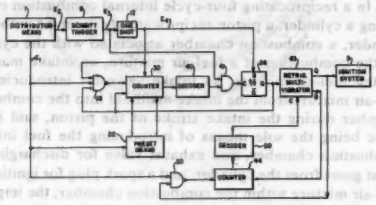
3,976,043
MEANS AND METHOD FOR CONTROLLING THE OCCURRENCE AND THE DURATION OF TIME INTERVALS DURING WHICH SPARKS ARE PROVIDED IN A MULTICYLINDER INTERNAL COMBUSTION ENGINE

Robert E. Canup, Chester, and Aubrey T. Burton, Richmond, both of Va., assignors to Texaco Inc., New York, N.Y.

Filed Dec. 19, 1974, Ser. No. 534,253

Int. Cl.² F02P *5/04, 1/00*

U.S. Cl. 123—148 E **8 Claims**



1. A system for controlling the occurrence and duration of time intervals during which sparks are provided in a multicylinder internal combustion engine for driving a crankshaft in which each cylinder has a moveable piston, comprising means for providing a first pulse signal whose pulse repetition rate corresponds to the rotational speed of the crankshaft; distributor means for providing a second pulse signal, each pulse in each cycle in the second pulse signal having a width corresponding to a predetermined rotational displacement of the crankshaft and having a relationship to the position of a piston in a corresponding cylinder; means for providing a spark time interval pulse signal, each pulse in the spark time interval pulse signal starting in response to a start pulse and terminating in response to a stop signal; means connected to the distributor means for shaping the pulses in the second pulse signal, programmable means connected to the first pulse signal means, to the shaping means and to the distributor means for providing the start pulses in accordance with the shaped pulses and the first pulse signal, the programmable means includes a flip flop having a set input, a clear input and an output; said flip flop providing a voltage at its output in accordance with its state; a one-shot multivibrator connected to the pulse shaping means and the set input of the flip flop and responsive to each pulse from the pulse shaping means for proving a negative going pulse to trigger the flip flop to a set state; a counter; first switching means connected to the output of the flip flop to the counter, and to the one-shot multivibrator and receiving the first pulse signal from the first pulse signal means for blocking the first pulse signal when the one-shot multivibrator provides a pulse or the flip flop is in a clear state and for passing the first pulse signal to the counter when the one-shot multivibrator does not provide a pulse and the flip flop is in a set state so that the counter counts the pulses in the first pulse signal from a count preloaded into it by the programming means; a decoder connected to the counter for providing a high level output until the count reaches the pre-

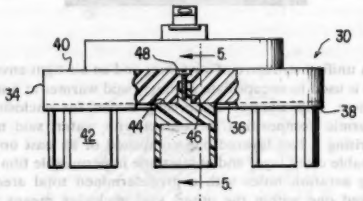
determined count and then providing a low level output, and AND gate receiving the shaped pulses and the output from the decoder for providing an output to the clear input of the flip flop so that when the counter reaches a predetermined count the output from the AND gate does from high level to a low level causing the flip flop to change from a set state to a clear state or when a shaped pulse terminates before the counter reaches the predetermined count to go from the high level to the low level; means for sensing the operating parameters of the engine and of the crankshaft and providing signals corresponding thereto; programming means connected to the first pulse signal means and to the sensing means for programming the programmable means in accordance with the sensed parameter signals and the first pulse signal so as to control the occurrence of the start pulses; means connected to the distributor means and to the spark time interval pulse signal means for providing the stop signal to the spark time interval pulse means in accordance with the first pulse signal from the first pulse signal means and the spark time interval pulse signal so as to control the duration of each spark time interval pulse; and ignition means connected to the spark time interval pulse signal means for providing sparks in the engine during the occurrence of a pulse in the spark time interval pulse signal and not providing sparks in the engine when a pulse in the spark time interval pulse signal does not occur.

3,976,044

BREAKERLESS DISTRIBUTOR WITH SUBSTITUTIONAL INTERRUPTER ARRAY

John W. Madeira, Stamford, and Kenneth E. Merklen, Cos Cob, both of Conn., assignors to Gulf & Western Industries, Inc., New York, N.Y.

Filed May 15, 1975, Ser. No. 577,841
Int. Cl.² H01R *39/02*; G01D *5/36*
U.S. Cl. 123—148 F **5 Claims**



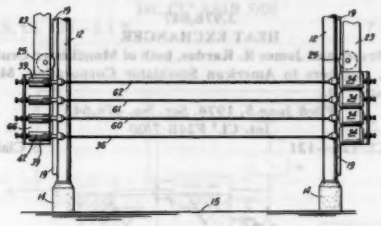
1. In a breakerless ignition distributor having a drive shaft extending upwardly through a vacuum advance plate and drivingly engaging a governor assembly and a distributor rotor, said distributor rotor having central spring and movable contact means secured thereto, preformed mounting apertures in each of said vacuum advance plate and distributor rotor, coacting breakerless distributor control means carried by said vacuum advance plate and distributor rotor, one of said coacting control means integrated with said vacuum control plate via said preformed mounting apertures and the other of said control means comprising an annular interrupter array including a plurality of spaced interrupter elements, the improvement comprising; mounting means removably mounting said spaced interrupter elements to said distributor rotor whereby alternate arrays of interrupter elements may be substitutionally integrated with said distributor rotor via the preformed mounting apertures in said rotor.

3,976,045

STONE CUTTING MACHINE

B. Frank Coggins, Jr., 250 Dogwood Lane, Elberton, Ga. 30635

Filed Feb. 28, 1975, Ser. No. 554,156
Int. Cl.² B28D *1/02*
U.S. Cl. 125—12 **1 Claim**



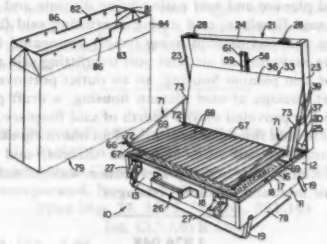
1. A stone cutting machine comprising a frame; a sliding beam movably supported on said frame; at least one flexible wire carried tautly by said sliding beam; motor means mounted on said sliding beam for rotating said taut flexible wire; second motor means for reciprocally moving said sliding beam on said frame; third motor means for axially reciprocating said taut flexible wire while said motor means rotates said wire and said second motor means reciprocally moves said sliding beam on said frame; a honing wire and a buffing wire carried tautly by said sliding beam; motor means for rotating said honing and buffing wires; and index means for interchanging the positions of said flexible wire, said honing wire and said buffing wire.

3,976,046

ATTACHE GRILL

Paul S. Morton, 82 Mandalay Drive, Kalamazoo, Mich. 49009, and John H. Rossio, 421 W. Melody Ave., Portage, Mich. 49081

Filed June 30, 1975, Ser. No. 591,306
Int. Cl.² A47J *37/00*; F24B *3/00*; F24C *1/16*
U.S. Cl. 126—9 R **12 Claims**



1. A portable and collapsible charcoal burning grill, comprising:

means defining a first open top receptacle and a first cover pivotally secured thereto and movable between open and closed positions relative thereto;

fastener means for fastening said first cover of said first open top receptacle in a closed position to define a carrying structure;

means defining a second open top receptacle and a second cover pivotally secured thereto and movable between open and closed positions relative thereto, said second open top receptacle means and said second cover being mounted in said first open top receptacle means;

holding means for holding said second cover in said open position and in a position of use;

food holding grill means removably engaging said second cover when said second cover is in said open position, said grill means extending over said second open top receptacle; and

charcoal holding grid means in said second open top receptacle.

3,976,047

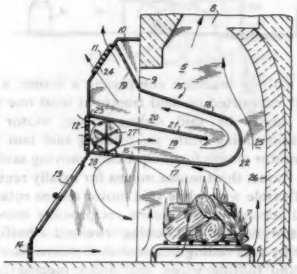
HEAT EXCHANGER

Max Breen, and James R. Kardas, both of Manchester Center, Vt., assignors to American Stovalator Corporation, Manchester, Vt.

Filed June 5, 1974, Ser. No. 476,643

Int. Cl.² F24B 7/00

U.S. Cl. 126—121 **5 Claims**



1. A heat exchanger for optimizing the room heating efficiency of a typical fireplace comprising a plenum including a radially extending housing having an upwardly sloped top wall and a downwardly sloped bottom wall connected at a closed apex, said housing including respective air inlet and air outlet passages, and a casing for removably mounting said plenum a predetermined distance above a fireplace hearth, said casing locating the rearward end of said air inlet passage provided in said plenum angularly downwardly towards said hearth, said apex of said plenum housing defining a narrow flue passage with a rearward wall of said fireplace for expulsion of effluent gases, said plenum and said casing being discrete and separable from said fireplace, said casing overfitting said fireplace hearthway and said plenum being fixedly connected thereto, said casing including an air inlet port overfitting said air inlet passage of said plenum housing, an air outlet port overfitting said outlet passage of said plenum housing, a draft port for drafting a fire provided on the hearth of said fireplace, means for access to said fireplace hearth, and an interiorly extending tongue foreshortened from said apex thereof, said tongue thereby defining with said top and bottom walls of said housing said air inlet and air outlet passages.

3,976,048

FIREPLACE STRUCTURE

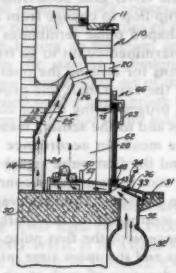
Robert G. Ashman, Jr., Pine Tree Drive, Plainville, Mass. 02762

Filed Sept. 16, 1974, Ser. No. 506,456

Int. Cl.² F24B 13/02, 1/18

U.S. Cl. 126—143 **6 Claims**

1. In a fireplace having an upwardly directed flue, a structure having an external housing with rear and side walls, a firebox having top, side, rear and bottom walls with an open front set within the structure to form a heat generating chamber, a closure for said open front impeding air flow into said firebox, a hearth, a duct leading from a source of outside air to said hearth, a hood capping said duct comprising generally horizontally extending top wall and three side walls downwardly extending from said top wall and an open side adjacent and below said closure for generally horizontal passage of air from said duct to the firebox at a location adjacent and above



and along the bottom wall of the firebox at the frontal portion thereof, means on said hood supporting said closure for sliding movement.

3,976,049

STRUCTURE OF WARMER

Iwao Yamashita, and Miyuki Shimizu, both of Oitashi, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed June 28, 1974, Ser. No. 484,236

Claims priority, application Japan, July 4, 1973, 48-74737; Sept. 8, 1973, 48-101485; Jan. 10, 1974, 49-5613; Feb. 27, 1974, 49-22383; Jan. 5, 1974, 49-5652[U]

Int. Cl.² F24J 1/00

U.S. Cl. 126—263 **15 Claims**

1. A unified structure of a warmer and an air-tight envelope which is used to encapsulate sealingly said warmer at non-service time, said warmer comprising means for enclosing an exothermic composition in contact with water, said means comprising a two layered bag composed of at least one air-permeable cloth layer and at least one impermeable film layer having aeration holes with a predetermined total area and arranged one within the other; said enclosing means being disposed within said air-tight envelope; and said exothermic composition which is activated on contact with air being selected from the group consisting of iron powder, a chloride and a sulfate of a metal having an ionization tendency greater than iron and active carbon filled in said bag, whereby upon opening of said airtight envelope, air contacts said exothermic composition and water to produce heat.

3,976,050

DEVICE FOR ADSORBING EXHALED RADIOACTIVE GASES AND PROCESS

Herman Glasser, New Hyde Park, and Patrick F. Panetta, East Islip, both of N.Y., assignors to Nuclear Associates, Inc., Carle Place, N.Y.

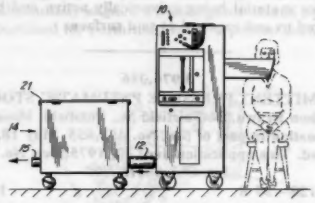
Filed Nov. 18, 1974, Ser. No. 524,457

Int. Cl.² A61B 5/08

U.S. Cl. 128—2 A **14 Claims**

1. An adsorption unit for the adsorption of a noble radioactive gas from a gas mixture, especially the exhalations from an animal, the unit comprising an outer case having an inner

compartment; a portable cartridge magazine removably receivable within said compartment and comprising a plurality of at least three closed chambers, each chamber containing activated carbon solid adsorbent for the radioactive gas, the plurality of chambers being in fluid flow series connection, but the solid adsorbent within each chamber being out of direct contact with the solid adsorbent in any other chamber; an inlet



to the first, or upstream chamber; (and) an outlet from the last or downstream chamber; and radioactive shielding material associated with at least some of the wall portions of said outer case, whereby said outer case forms a storage unit which substantially confines radiation emanating from said cartridge magazine, said cartridge magazine being removable from said outer case and replaceable by another like cartridge magazine upon the expiration of the life span thereof.

3,976,051

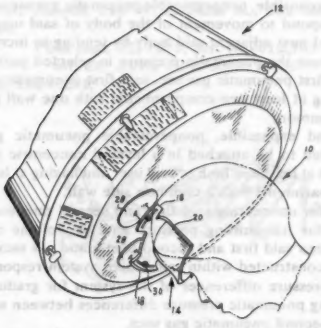
HEAD-POSITIONING SCINTILLATION CAMERA AND HEAD HOLDER THEREFOR

Thomas D. Kay, USAFSAM/NGIR, Brooks AFB, Tex. 78235

Filed Aug. 5, 1975, Ser. No. 602,041

Int. Cl.² A61B *6/00*

U.S. Cl. 128—2 A **10 Claims**



1. The combination of a holder for the head of a patient undergoing a vertex brain scan and a scintillation camera comprising a plurality of fastening means for removably securing said holder to the face of said scintillation camera, a base portion secured to said fastening means, a U-shaped body extending from said base portion, said body having a concavely-shaped interior configuration for receiving the forehead of a patient and means located within and conformed to fit said interior of said body for comfortably supporting said head of a patient therein whereby said patient may undergo said brain scan in the sitting position.

3,976,052

RESPIRATION MONITOR

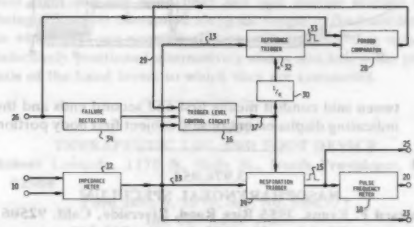
Gerhard Junginger, Holzgerlingen, and Helmut Zeeb, Kirchentellinsfurt, both of Germany, assignors to Hewlett-Packard GmbH, Wurttemberg, Germany

Filed Jan. 10, 1975, Ser. No. 540,038

Claims priority, application Germany, Apr. 19, 1974, 2418910

Int. Cl.² A61B *5/08*

U.S. Cl. 128—2.1 Z **7 Claims**



1. Apparatus for monitoring the respiration activity of a patient and for suppressing disturbing signals comprising:

first means connectable to a patient for providing a variable thorax impedance signal;

second means connectable to the patient for providing a heart rate signal;

trigger level means coupled to said first means for providing an adjustable threshold value, said trigger level means having control input means for raising said threshold value;

reference trigger means coupled to said trigger level means and said first means for producing a trigger pulse in response to the amplitude of said thorax impedance signal exceeding a level related to said threshold value;

comparator means coupled to said reference trigger means and said second means for providing an output signal to the control input means of said trigger level means in response to said trigger pulse and said heart rate signal having substantially equal periods, thereby to raise said threshold value; and

output means coupled to said trigger level means and said first means for producing a respiration signal in response to the amplitude of said thorax impedance signal and said threshold value.

3,976,053

APPARATUS AND METHODS FOR USE IN MEASURING RESPIRATION CHARACTERISTICS

Wolf Reininghaus, Cologne, Germany, assignor to Philip Morris Incorporated, New York, N.Y.

Filed May 27, 1975, Ser. No. 581,101

Int. Cl.² A61B *5/08*

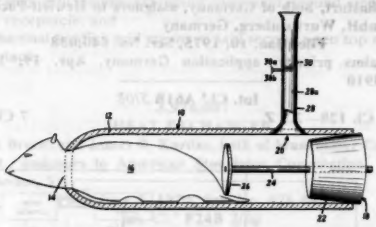
U.S. Cl. 128—2.08 **11 Claims**

1. Apparatus for use in measuring respiration characteristics of a subject, comprising:

a. vessel means for containing a fluid medium and a subject first body portion which body portion is expansible and contractible during respiration, said vessel means having a first wall part defining an opening for sealably encircling a second body portion of such subject whereby the head portion of such subject is disposed exteriorly of said vessel means, said vessel means having a second wall part defining a further opening;

b. conduit means having a first end in sealable engagement with said vessel means second wall part defining said further opening and having a second end and supporting substantially free fluid medium flow between said first and second ends thereof; and

c. sensor means disposed in said conduit means for generating an output signal indicative of fluid medium flow be-



tween said conduit means first and second ends and thus indicating displacement of said subject first body portion.

3,976,054

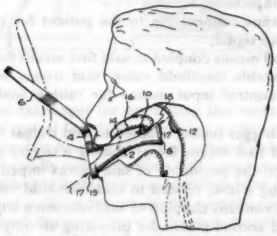
NASOPHARYNGEAL SPECULUM

Howard F. Evans, 3955 Rice Road, Riverside, Calif. 92506

Filed Jan. 20, 1975, Ser. No. 542,345

Int. Cl.² A61B 1/26

U.S. Cl. 128—4 **11 Claims**



1. A nasopharyngeal speculum for providing a direct line of signt to the nasopharynx of humans, said nasopharyngeal speculum including:

a tubular portion having a pair of ends serving as a leading end and a viewing end, said tubular portion forming a lumen, said pair of ends being flared;

a handle portion having a bend proximate to a first end thereof forming a major handle section and a minor handle section on opposite sides of said bend, said viewing end of said tubular portion being attached to said first end of said handle portion with said major handle section being bent away from said leading end of said tubular portion; and

conduit means for conducting a vacuum to said leading end of said tubular portion to allow suction thereat.

3,976,055

ELECTRODE AND CONDUCTOR THEREFOR

Robert Paul Monter; Albert Moore Hall, both of Centerville, and James Vernon Cartmell, Dayton, all of Ohio, assignors to NDM Corporation, Dayton, Ohio

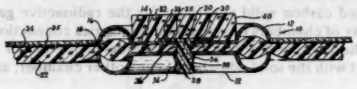
Continuation-in-part of Ser. No. 424,959, Dec. 17, 1973, abandoned. This application Nov. 27, 1974, Ser. No. 527,033

Int. Cl.² A61B 5/04

U.S. Cl. 128—2.06 E **38 Claims**

1. A conductor adapted to be bridged to a source of periodically varying signals by an electrolyte contacted to one surface of said conductor and also contacted to said source, said conductor comprising:

a first conductor material and a second conductor material contacting said first conductor material, said first conductor material being galvanically inactive, said second con-



ductor material being galvanically active and being anchored to and exposed at said surface.

3,976,056

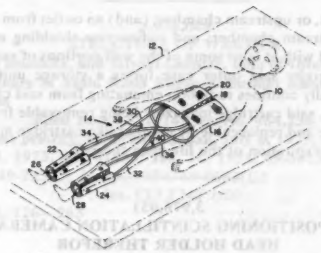
INTERMITTENT PRESSURE PNEUMATIC STOCKING

Peter Nelson Brawn, 36 Fairfield St., Pittsfield, Mass. 01201

Continuation-in-part of Ser. No. 452,455, May 18, 1974, abandoned. This application Jan. 20, 1975, Ser. No. 542,604

Int. Cl.² A61H 1/00

U.S. Cl. 128—24 R **18 Claims**



1. An intermittent pressure pneumatic stocking closed system for use with a gas for creating changes of pressure on selected parts of the body of a user or patient for stimulating blood flow comprising:

a first expansible, nonpermeable pneumatic gas sac adapted to respond to movement of the body of said user when placed next adjacent said body by tending to increase or decrease the pneumatic pressure in selected portions of said first pneumatic gas sac, said first pneumatic gas sac having at least two compartments with one wall portion in common;

a second expansible, nonpermeable pneumatic gas sac adapted to be attached in a layered concentric manner about at least one limb of said user and having at least two compartments with a common side wall;

means for connecting said first and second pneumatic gas sacs for transmitting pressure and gas volume changes between said first and second pneumatic gas sacs; and

means constructed within said closed system responsive to gas pressure differences of the system for gradually reducing pneumatic pressure differences between said first and second pneumatic gas sacs.

3,976,057

JOINT FLEXING APPARATUS

Doltie W. Barclay, Ilion, N.Y., assignor to Clarence F. Bates, Middleville; William D. Heron, Little Falls; Gerald E. Bates, Utica and Irving Mason, Herkimer, all of, N.Y., part interest to each

Filed Dec. 23, 1974, Ser. No. 535,704

Int. Cl.² A61H 1/02

U.S. Cl. 128—25 R **5 Claims**

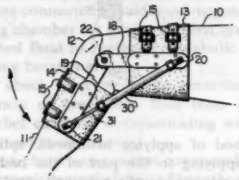
1. A device for flexing and extending a body joint such as a knee or elbow comprising:

first strap means for completely encircling the body near and on one side of the joint to be exercised;

second strap means for completely encircling the body near and on the other side of the joint to be exercised;

linkage means extending between said first strap means and said second strap means in predetermined relationship with the joint,

said linkage means having a first link portion rigidly secured to said first strap means and a second link portion secured to said second strap means and means defining a pivot point connecting said link portions substantially aligned with the pivot axis of a joint to be exercised for permitting relative pivotal motion of said



link portions, which motion corresponds with motion of a body portions joined at the joint to be exercised;

fluid drive means connected between said first and second strap means to form the third side of a triangle with said first and second link portions for moving said strap means alternately toward and away from each other to flex and extend a body joint and, with said link portions, for minimizing compressive and extensive forces at the body joint;

a source of fluid under pressure;

valve and control means for controlling the application of fluid from said source to said drive means; and

conduit means for interconnecting said source, said valve means and said drive means.

3,976,058

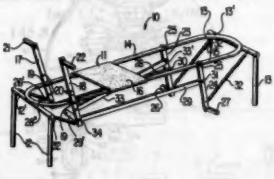
PHYSICAL COORDINATION TRAINING DEVICE

James H. Tidwell, 116 W. Hopkins St., San Marcos, Tex. 78666

Filed Sept. 12, 1975, Ser. No. 612,703

Int. Cl.² A61H *1/02*; A63B *31/00*

U.S. Cl. 128—25 R **8 Claims**



1. A physical training device for teaching diverse basic skills of muscle control and body coordination, comprising an elongated frame supported above a floor, right hand and right foot levers pivotally supported in longitudinally spaced relationship on one side of the said frame, left hand and left foot levers pivotally supported on the opposite side of said frame, the right and left hand levers having pivot axes which are aligned transversely with respect to said frame, and the right and left hand foot levers having pivot axes which are likewise aligned transversely with respect to said frame, a body support on said frame at a location between the hand lever axes and the foot lever axes, a right link pivotally interconnecting said right hand and right foot levers, a left link pivotally interconnecting said left hand and left foot levers, and a motion transfer bar pivotally interconnecting the foot lever on one side of said frame with the hand lever on the opposite side of said frame, said right and left foot levers each having upper and lower ends, the pivot axis of each of said foot levers being located in the upper ends of the foot levers so that the foot levers depend downwardly from said frame, foot engaging means at the lower end of each of the foot levers, said hand levers each having upper and lower ends and having their pivot axis located intermediate their ends so that the opposite ends of the hand levers extend above and below their pivot axis, hand engaging means at the upper end of each of the hand levers, said right and left hand links and said motion transfer bar being adjustably connected along the length of the hand levers to which they are respectively connected so that they may be selectively positioned alternatively above and below the pivot axis of the hand levers to which they are connected.

3,976,059

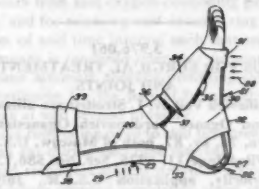
THERAPEUTIC LEG AND FOOT DEVICE

Robert Lonardo, 1175 N. Main St., North Providence, R.I. 02904

Filed June 6, 1975, Ser. No. 584,371

Int. Cl.² A61F *3/00*

U.S. Cl. 128—80 E **10 Claims**



1. A therapeutic leg and foot device comprising an L-shaped member of a flexible, transparent, acrylic, plastic, said member having a generally contoured and channel-shaped leg portion, a curved heel portion integral with one end of said leg portion, and a generally contoured foot portion extending integrally from said heel portion at right angles to said leg portion, said foot portion being shorter than the adult human foot, the channel shape of said leg portion being substantially flattened at said heel portion, said curved heel portion being narrower than said foot and leg portions and having a free and unflanged edge to permit flexing of said foot portion with respect to said leg portion, said foot portion exerting a pressure of 30 to 50 lbs. toward said leg portion when said foot portion is flexed away from the right angle position, and means for releasably securing the device to the leg and foot of a patient.

3,976,060

EXTENSION APPARATUS, ESPECIALLY FOR OSTEOTOMIC SURGERY

Jürgen J. Hildebrandt, Brunnthal; Paul Zahn, Riemerling; Alfred Nikolaus Witt, Gmund, and Michael Jäger, Munich, all of Germany, assignors to Messerschmitt-Bolkow-Blohm GmbH, Munich, Germany

Filed Apr. 1, 1975, Ser. No. 564,067

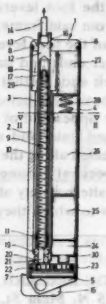
Claims priority, application Germany, Apr. 9, 1974, 2417233

Int. Cl.² A61F *5/04*

U.S. Cl. 128—84 R **16 Claims**

1. An apparatus, especially for osteotomic surgery, comprising a housing, extension means movably supported in said housing and including an extension member movably extending out of said housing, power drive means also supported in said housing and operatively connected to said extension means for moving said extension member, means sealing said

housing to form an implantable structural unit, said power drive means comprising a drive motor and a source of power operatively connectable to said motor, said apparatus further comprising implantable control means also supported in said



housing and responsive to external actuation, said control means being operatively connected to said power drive means inside said implantable structural unit, and implantable connecting means secured to said housing for connection of the apparatus to a bone.

3,976,061

APPARATUS FOR SURGICAL TREATMENT OF BONES AND JOINTS

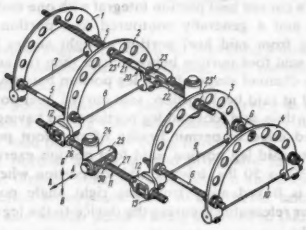
Mstislav Vasilievich Volkov, 1, Stroitelnaya ulitsa, 6, korpus 1, kv. 63, and Oganes Vardanovich Oganesian, ulitsa Pervomaiskaya, 74, kv. 87, both of Moscow, U.S.S.R.

Filed June 11, 1975, Ser. No. 586,137

Claims priority, application U.S.S.R., July 22, 1974, 2052127

Int. Cl.² A61F 5/04

U.S. Cl. 128—84 B **5 Claims**



1. An apparatus for surgical treatment of bones and joints comprising: at least two pairs of needles designed to be driven through the juxtaposed bones; at least two braces, the tips of said needles of one of said pairs of needles being secured in each said brace so that said brace forms a rigid system with said needles, said rigid system being designed to be secured on the respective bone being juxtaposed; two distractors interconnecting said rigid systems, each said distractor being formed as a split member composed of two roughly equal components; each component of said distractor having one end thereof attached to said brace of said rigid system and having a second end; a slider fastened to said second end of said distractor component; two interconnected guides, said slider of one of said distractor components moving along one of said guides; said guides disposed in perpendicular relationship one with the other and also with the longitudinal axes of said distractor components connected therewith by way of said sliders; screw actuators for propelling said sliders along said guides.

3,976,062

METHOD OF APPLYING ORTHOPEDIC SPLINTS

Mervyn K. Cox, St. George, Utah, assignor to Mervyn K. Cox, St. George, Utah

Filed Apr. 21, 1975, Ser. No. 570,270

Int. Cl.² A61F 5/04

U.S. Cl. 128—87 R **7 Claims**

1. A method of applying orthopedic splints or bracing, comprising applying to the part of the body concerned, a series of elongate splints of a relatively rigid plastic material in mutually spaced relationship so the splints extend longtudinally of the body part concerned; applying about said series, transversely of said splints, bands of perforated plastic material for holding said splints in place; and securing said bands to said splints by an adhesive agent at the points of contact between the bands and the splints, said adhesive agent being capable of bonding the plastic material of the splints to the plastic of the perforated bands, whereby said bands support said splints and the splints and bands together provide a strait-jacketing structure for said body part concerned.

3,976,063

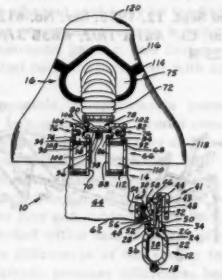
ESCAPE BREATHING APPARATUS

John W. Henneman, and Duane E. Hinds, both of Davenport, Iowa, assignors to The Bendix Corporation, South Bend, Ind.

Filed Sept. 16, 1974, Ser. No. 506,497

Int. Cl.² A62B 7/04

U.S. Cl. 128—142.7 **11 Claims**



1. A closed loop breathing system for providing emergency protection from an irrespirable atmosphere, said system comprising:

package means attachable to the waist of a person;

covering means attached to said package means to prevent the transmission of contaminants into the interior of the package means;

zipper means connected to said covering means and responsive to an operator for providing access to a portion of the component parts of said breathing system located in said interior of the package means;

container means located in the interior of said package means for retaining a quantity of a first breathable fluid;

first control means connected to said container means for regulating the flow of said first fluid from the container means;

actuator means associated with said first control means and responsive to an operator input to allow said first breathable fluid to continually flow from said container means;

conduit means connected to said first control means for directing the flow of said first fluid away from said container means;

hood means connected to said conduit means, said hood means forming a seal with said person to prevent any of the irrespirable atmosphere from reaching the nose and mouth area of said person;

reservoir means connected to said hood means for establishing a mixing chamber for mixing the first breathable fluid with breathed fluid to replenish metabolic oxygen consumed during breathing;

first one-way check valve means for permitting inhalation by the person of breathable fluid from the reservoir means a relief chamber communicating with said hood means into said hood means;

second one-way check valve means connected to said hood means for permitting exhalation of breathed fluid by the person into said relief chamber, said relief chamber being connected to said reservoir means to allow a portion of the breathed fluid to be communicated to the mixing chamber;

filter means located between the relief chamber and the reservoir means for removing any water vapor and carbon dioxide from the breathed fluid before being communicated to the mixing chamber;

relief valve means located in the relief chamber for maintaining the pressure in the mixing chamber within a predetermined range; and

curtain means attached to said hood means and extending to the shoulders of the person to further protect the person from any harmful conditions present in said irrespirable atmosphere.

3,976,064

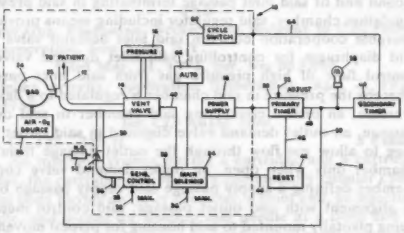
INTERMITTENT MANDATORY ASSISTED VENTILATION SYSTEM FOR POSITIVE PRESSURE BREATHING APPARATUS

William W. Wood, 478 Shadowood, NW., Comstock Park, Mich. 49321; James E. Greenwood, 675 Nordberg, NW., Grand Rapids, Mich. 49503, and Walter M. Clements, 8984 Thirteen Mile Road, Rockford, Mich. 49341

Filed Mar. 11, 1975, Ser. No. 557,254

Int. Cl.[2] A61M *16/00*

U.S. Cl. 128—145.8 **16 Claims**



1. In a respiration system having a breathing tube with an open output end for delivering oxygen-containing gas to a patient and an input end;

means connected to the input end of the breathing tube for supplying oxygen-containing gas to the breathing tube at a first pressure near or at atmospheric pressure for unassisted breathing by the patient;

means for providing oxygen-containing gas to the breathing tube at a second pressure higher than the first pressure for providing a ventilation assist to the patient, said second higher pressure gas providing means including a ventilation valve coupled to said input end of said breathing tube for controlling the flow of oxygen-containing gas at said second pressure to said breathing tube;

sensitivity control means coupled to said breathing tube for determining the pressure therein, said sensitivity control means including means for actuating said ventilation valve responsive to the presence of a third pressure in said breathing tube, said third pressure being below said first pressure, said sensitivity control means providing a ventilation assist to the patient responsive to an inspiration by the patient;

the improvement which comprises:

timing means for measuring a given time interval sufficient to allow the patient to inhale and exhale at least one unassisted breath, means for desensitizing said sensitivity control means so as to render the same inoperative; and means coupling said timing means to said desensitizing means for desensitizing said sensitivity control means during each given time interval of said timer such that the ventilation valve is inoperative during the time interval to allow the patient to inhale and exhale at least one unassisted breath from said oxygen-containing gas at said first pressure, and for releasing said desensitizing means upon expiration of said time interval such that said sensitivity control means is rendered operative subsequent to each of said time intervals, thereby providing subsequent assisted ventilation for the patient from said oxygen-containing gas at said second pressure;

said breathing tube being open to said first pressure oxygen-containing gas during said time interval;

whereby said respirator system provides a single intermittent mandatory assisted ventilation upon inspiration by the patient after expiration of the time interval during which the patient breaths unassisted from the first pressure oxygen-containing gas.

3,976,065

DIGITAL FLUIDIC VENTILATOR

Gerald Durkan, 6 Emerson St., Uniontown, Pa. 15401

Filed Mar. 10, 1975, Ser. No. 557,100

Int. Cl.[2] A61M *16/00*

U.S. Cl. 128—145.8 **19 Claims**

1. A respiratory ventilator comprising:

source means providing gas to be administered to a patient's lungs;

valve means connected to said source means and normally preventing the flow of gas to the patient;

fluid conveying means for conveying gas from said valve means to the patient when said valve means is activated;

exhalation valve means connected to said fluid conveying means for exhausting gas exhaled from the patient;

a fluid flipflop having a set state and a reset state;

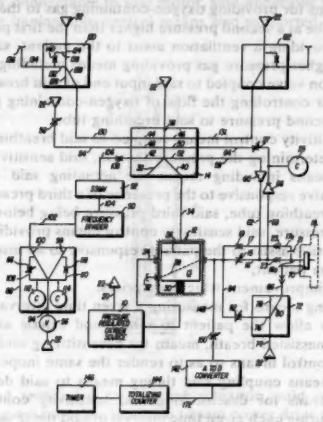
means connecting said flipflop to said valve means to actuate said valve means when said flipflop is in said set state;

bias means for applying a continuous bias signal of fixed magnitude to said flipflop tending to switch it to said set state;

first means connected to said fluid conveying means and said flipflop for transmitting a negative inspiratory pressure in said fluid conveying means to said flipflop if the patient begins to inhale, said negative pressure tending to aid said bias signal in switching said flipflop to said set state; and,

second means connected to said fluid conveying means and

said fluid flipflop for transmitting the positive pressure in said fluid conveying means to said flipflop to switch it to



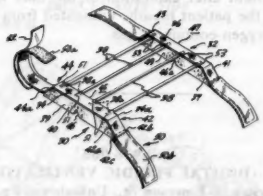
said reset state when a predetermined positive pressure is present in said fluid conveying means.

3,976,066

SKIN PROTECTIVE DEVICE

James S. McCartney, 2645 S. 312th St., Federal Way, Wash. 98002

Filed Apr. 28, 1975, Ser. No. 572,275
Int. Cl.² A61F 5/30, 13/00
U.S. Cl. 128—153 45 Claims



1. An article for protecting a first skin area on the body from foreign contact, while permitting air to circulate thereabout, comprising:

a. resiliently deformable mounting means positionable on, and conformable to the contour of, substantially any portion of the body including a second skin area situated relatively near said first skin area;

b. means for 1) securing said mounting means to said second skin area without producing residual pressure thereon, such that the blood supply to said first and second skin areas is substantially unaffected when said mounting means is so secured to said second skin area, and further for 2) maintaining said mounting means in position on, and in conformance to the contour of, said second skin area during substantially any normal movement of the one portion of the body which includes the location of said first skin area; and

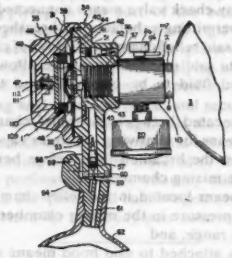
c. protector means capable of passing air between the atmosphere and said first skin area and mounted on said mounting means so as to extend over and be spaced away from said first skin area, said protector means having sufficient rigidity to substantially prevent foreign contact with said first skin area, wherein said resiliently deformable mounting means is of such a size and configuration and sufficiently compressible and wherein said protector means is mounted thereon in such a manner, that said mounting means is capable of absorbing external pressure exerted thereon, including pressure exerted by said protector means as a result of said normal movement of said one portion of the body, without the character of the contact between said mounting means and said second skin area being substantially altered, whereby the supply of blood into said first and second skin areas remains substantially unaffected.

3,976,067

GAS DISPENSING ASSEMBLY

William R. Amlong, Miami, Fla., assignor to Safety Laboratories, Inc., Miami, Fla.

Filed July 2, 1974, Ser. No. 485,692
Int. Cl.² A61M 16/00
U.S. Cl. 128—203 10 Claims



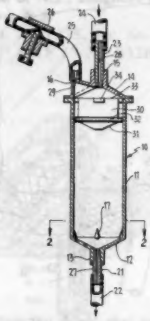
1. A self-contained oxygen dispensing assembly comprising a housing defining an inlet passage having first and second ends, and an outlet passage, an interchangeable high pressure oxygen supply vessel removably connected to said first end of said inlet passage to supply oxygen thereto said vessel having an outlet demand valve, a supply control means mounted in said inlet passage and operable to open said vessel demand valve to control oxygen flow from said source to said inlet passage, an inlet demand valve disposed in said inlet passage adjacent said second end to control gas flow from said source through said inlet passage, a resiliently biased diaphragm regulator disposed in said housing at the second end of said inlet passage and including a pressure regulation chamber said second end of said inlet passage terminating in said pressure regulation chamber, said regulator including means providing operable cooperation between said inlet demand valve and said diaphragm for controlling said inlet demand valve to control flow of high pressure gas from said inlet passage whereby the pressure in said chamber is regulated to a desired pressure, an orifice connecting said chamber to said outlet passage, an outlet demand valve disposed in said outlet passage to allow gas flow through the outlet passage from the chamber only when open, an outlet demand valve control member defining a supply passage said supply passage being in alignment with said outlet passage; said control member being pivotally mounted to said housing for pivotal movement between an outlet demand valve opening position in which said supply passage communicates with said outlet passage and a nonoperative position in which said outlet demand valve is not opened by said control member, a face mask mounted on said control member to receive oxygen from said outlet passage by way of said supply passage when said control member opens said outlet demand valve.

3,976,068

DRUG DISPENSER FOR USE WITH INTRAVENOUS FEEDING PUMP

Ingemar H. Lundquist, Oakland, Calif., assignor to Origo, Inc., Hayward, Calif.

Filed Jan. 3, 1975, Ser. No. 538,372
Int. Cl.² A61M 5/14
U.S. Cl. 128—214 R 10 Claims



1. A drug dispensing device for a patient adapted for use in conjunction with an intravenous feeding pump providing a source of parenteral fluid supplied aat a controlled rate comprising:

a. a cylinder;

b. means enclosing both ends of said cylinder;

c. a liquid separator slidably fitting inside said cylinder and forming first and second chambers in said cylinder on opposite sides of said liquid separator;

d. a fluid inlet into one end of said cylinder in continuous communication with said first chamber and adapted to be connected to said source of parenteral fluid;

e. an outlet from the other end of said cylinder; and in continuous communication with said second chamber and adapted to be connected to the patient,

f. a drug in a liquid carrier disposed in said second chamber;

g. means adjacent said outlet end of said cylinder for bypassing said liquid separator whereby upon introduction of parenteral fluid into said first chamber said liquid separator will be moved to cause said drug in a liquid carrier to be forced into the patient and thereafter parenteral fluid into the patient without breaking the connections between the source of parenteral fluid and the patient.

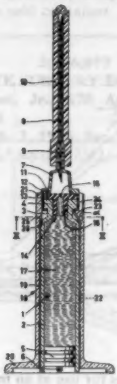
3,976,069

INJECTION SYRINGE WITH CARTRIDGE RETAINING TAB

Daniel Ong, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 31, 1975, Ser. No. 563,565
Claims priority, application Netherlands, Apr. 8, 1974, 7404736
Int. Cl.² A61M 5/00
U.S. Cl. 128—218 D 5 Claims

1. An injection syringe having a cartridge and a cartridge holder, the cartridge comprising a substantially circular cylindrical body having an outer diameter, a front end, an injection needle, and means for holding said needle at a front end of said body, said body having a circumferential restriction adjacent said front end and an axially and radially extending flange beyond said restriction; the cartridge holder comprising a substantially circular cylindrical hollow body having a rear portion having a grip, and a front end having a number of inward projections, said cylindrical body having an inner wall having inner diameter greater than said outer diameter, adapted to receive a cartridge therein; wherein said inward projections are a plurality of resilient tabs extending away from said rear portion obliquely inwardly at an acute angle with respect to said inner wall, and having a rear edge connected to said inner wall, and said holder comprises means for allowing said tabs to be deflected outward upon insertion of a cartridge into the holder from the rear, said tabs being adapted to spring inward and engage said restriction upon complete insertion of a cartridge.

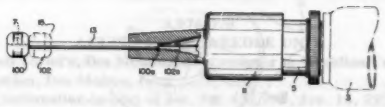


3,976,070

NEEDLE REINFORCING MEANS FOR SMALL GAUGE HYPODERMIC NEEDLES

Mark Dumont, 3335 Dunbar St., Vancouver, British Columbia, Canada

Continuation of Ser. No. 437,396, Jan. 28, 1974, abandoned. This application Feb. 25, 1975, Ser. No. 552,758
Int. Cl.² A61M 5/00
U.S. Cl. 128—221 2 Claims



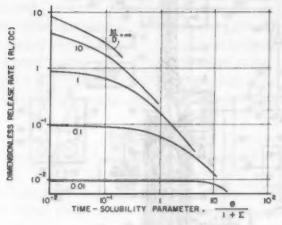
1. In combination with a hypodermic needle affixed to a base at its rear end and having a forwardly directed free tip end remote from said base; a needle support member firmly secured to said base and having a bore therein through which the needle extends, with said free tip end of the needle projecting forwardly from said member; a unitary needle guard sleeve slidably encompassing and having a smooth sliding fit with said needle throughout the entire length of said sleeve and throughout a major portion of the length of said needle, with one end of said sleeve telescopically slidably received in said bore of the needle support member; said needle guard sleeve having a forwardly directed blunt free end projecting from said needle support member and normally being substantially co-terminus with the tip end of said needle, but being partially retractable into said needle support member to expose said tip end of the needle while encompassing and engaging a medial portion of said needle to support the same against bending.

3,976,071

METHODS OF IMPROVING CONTROL OF RELEASE RATES AND PRODUCTS USEFUL IN SAME

Safik E. Sadek, Wayland, Mass., assignor to Dynatech Corporation, Burlington, Mass.

Filed Jan. 7, 1974, Ser. No. 431,493
Int. Cl.² A61K 27/12; A61M 31/00
U.S. Cl. 128—260 22 Claims



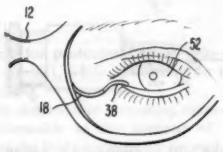
1. Solid-shaped articles for use as an implant in living tissue which implant is a means for administering at a more favorable dosage rate, said articles formed of (1) an active pharmaceutical chemical agent and (2) an organic polymer matrix, said agent and polymer normally forming a composition wherein there is substantial insolubility of one in the other, wherein said articles are formed of a composition of said agent and said polymer which is a solid solution and comprises substantially all of said agent in solution.

3,976,072

BLINK-OPERATED EXTRACORPOREAL TEAR DUCT

Elijah C. Walker, Bethesda, Md., assignor to The United States of America as represented by the Secretary of the Department of Health, Education and Welfare, Washington, D.C.

Filed Sept. 3, 1975, Ser. No. 609,985
Int. Cl.² A61M 31/00
U.S. Cl. 128—260 8 Claims



1. An eyelid-actuated duct for supplying a beneficial solution to the eye of the user comprising:

reservoir means for storing the solution;

pump means for introducing the solution to the eye of the user and for drawing additional solution from said reservoir, said pump means including a compressible and recoverable elastic component for location in cooperative engagement with the eyelid of the user;

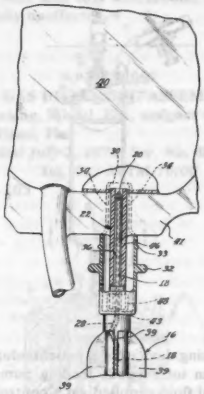
whereby when the upper eyelid of the user exerts pressure upon and compresses said elastic component the solution contained in said pump means is dispersed over the eye of the user, and when said elastic component recovers its uncompressed shape a partial vacuum is created to draw additional solution from said reservoir.

3,976,073

VIAL AND SYRINGE CONNECTOR ASSEMBLY

John L. Quick, Buffalo Grove, and Daniel D. Wyncott, Arlington Heights, both of Ill., assignors to Baxter Laboratories, Inc., Deerfield, Ill.

Filed May 1, 1974, Ser. No. 465,988
Int. Cl.² A61J 5/00
U.S. Cl. 128—272 2 Claims



1. A syringe connector assembly, in combination with a flat-edged container which carries a projecting tubular injection site extending through said flat edge, which assembly comprises:

a syringe connector, adapted for connection with a vial, said connector carrying a hollow injection needle with a forward pointed end, said needle passing through said projecting tubular injection site;

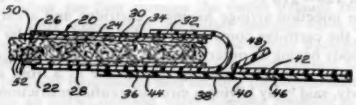
a substantially rigid sleeve having a first end mounted on said syringe connector and a second end extending axially beyond said forward needle end in spaced relation thereto, a pair of opposed, axial slots in said sleeve extending axially from said second end, said forward needle end extending at least beyond the inner end of said slots, said flat container edge being positioned within said axial slots and said injection site being positioned within said sleeve, whereby said forward end of the injection needle is sufficiently advanced through said injection site to be in direct communication with the interior of said container.

3,976,074

ABSORBENT ARTICLE

Harry G. Fitzgerald, Green Bay, Wis., and Donald Patience, Barrington, Ill., assignors to Colgate-Palmolive Company, New York, N.Y.

Filed Aug. 8, 1975, Ser. No. 603,071
Int. Cl.² A61F 13/16; A41B 13/02
U.S. Cl. 128—284 18 Claims



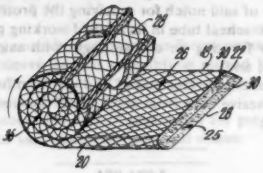
1. A disposable absorbent article for body contact to absorb body fluids comprising, an absorbent pad having a mass of hydrophilic fibers and a matrix of a comminuted hydrophobic material dispersed in interfiber spaces defined by said fibers

throughout at least a portion of said pad, with at least a portion of said hydrophobic material comprising a fused comminuted thermoplastic material.

3,976,075
TAMPON BLANK WITH REDUCED SLOUGHING PROPERTIES

Kays Chinai, Burlington Township, and Alfred Amend, Kendall Park, both of N.J., assignors to Personal Products Company, Milltown, N.J.

Filed Feb. 24, 1975, Ser. No. 552,391
Int. Cl.² A61F 13/20; B32B 31/14
U.S. Cl. 128—285 **8 Claims**

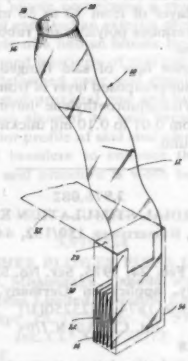


1. A catamenial tampon blank for producing a finished tampon, said blank comprising a pad of absorbent material turned upon itself wherein means are provided for reducing sloughing from the outside surface of the tampon and for reducing telescoping of the tampon, said means comprising having printed on at least one pad surface a non-occlusive pattern of adhesive binder, a part of said printed pad surface being that which forms at least a part of the outside surface of the blank, the remainder of said printed pad surface being in the interior of said blank.

3,976,076
MEDICAL APPARATUS

Janet Beach, P.O. Box 904, Camden, Maine 04843

Filed June 24, 1974, Ser. No. 482,160
Int. Cl.² A61F 5/44
U.S. Cl. 128—295 **3 Claims**

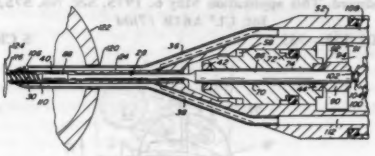


1. For use in collecting urine from bed-ridden humans, apparatus comprising a tube made from thin material that is impermeable to acqueous liquids, having one end closed by means of a flat seam, and the other end biased toward being retained open by a grommet-like resilient expander which is integral therewith, said tube other than in the region of said expander being so supple that it will collapse substantially entirely from its own weight when laid on its side, and may be lapped upon itself for storage, said tube being lapped into a fan-fold configuration and positioned within an associated container with said open end of said tube accessible for grasping, whereby desired lengths of said tube may be withdrawn from said container.

3,976,077
EYE SURGERY DEVICE

Franklin W. Kerfoot, Jr., 678 Andover Road, Newtown Square, Pa. 19073

Filed Feb. 3, 1975, Ser. No. 546,591
Int. Cl.² A61B 17/32; A61F 9/00
U.S. Cl. 128—305 **25 Claims**

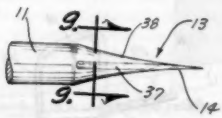


1. Eye surgery apparatus comprising a shaft having a free end in the form of a tool, means for rotating said shaft at a high rate of speed at which half frequency whirl could occur and a bearing system including a first fluid-lubricated sleeve bearing and second fluid-lubricated sleeve bearing means, said first bearing being mounted with its central axis offset and slightly angled with respect to the central axis of said second bearing means, said shaft extending through said first bearing and said second bearing means, said shaft being bent slightly and loaded by said offset first bearing, whereby respective portions of said shaft make contact with respective portions of the interior periphery of said first bearing and second bearing means when said shaft is stationary and move out of contact therewith to ride with very little friction on a layer of lubricating fluid interposed between the shaft and the interior periphery of the first bearing and second bearing means when the shaft is rotating at a high speed, to preclude the shaft from entering the unstable condition wherein its central axis orbits around the central axis of said first bearing or said second bearing means as the shaft rotates.

3,976,078
ACUPUNCTURE NEEDLE UNIT

Danti Toriello, Des Moines, Iowa, assignor to Meridian Corporation, Des Moines, Iowa

Continuation-in-part of Ser. No. 432,995, Jan. 14, 1974, abandoned. This application Nov. 22, 1974, Ser. No. 526,322
Int. Cl.² A61B 17/34; B25G 3/34
U.S. Cl. 128—329 A **1 Claim**



1. An acupuncture needle unit comprising:
a. an elongated flexible needle member composed of a stainless steel material and having a working end section and a body insertible end section formed with a pointed terminal portion,
b. a tubular handle member having an axial bore therein of a size to telescopically receive therein said working end

section over substantially the full length of said handle member, and

c. means for rigidly securing together said handle member and working end section,

d. said pointed terminal portion having an angle of not greater than about 4° relative to the longitudinal axis of the needle member and a peripheral surface having only axially extended tool markings thereon so as to have continuous engagement with the side wall of a puncture formed thereby.

3,976,079

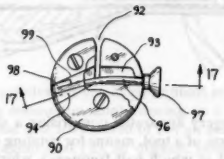
SECURING DEVICES FOR SUTURES

Peter B. Samuels, 14708 Sutton St., Sherman Oaks, Calif. 91316, and Ernest C. Wood, 2461 Ivanhoe Drive, Los Angeles, Calif. 90039

Continuation-in-part of Ser. No. 493,759, Aug. 1, 1974, abandoned. This application May 6, 1975, Ser. No. 575,004

Int. Cl.² A61B *17/04*

U.S. Cl. 128—335 **6 Claims**



1. A device for releasably securing a suture in position over a wound, comprising:

a cylindrical button-like member having a radially extending slot for receiving said suture therein and a channel extending therethrough intersecting said slot, said channel being formed in two complementarily inclined sections which intersect at said slot and diverge radially outwardly therefrom for exerting increasing lateral force on said compression means as it is moved to the compression position to securely lock said means in said compression position; and

means provided in said channel and movable between a compression position and a release position for compressing said suture against said button-like member in said compression position and for releasing said suture to permit adjustment or removal in said release position.

3,976,080

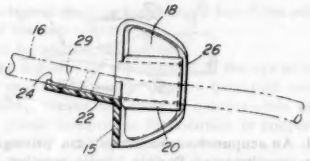
ENDOTRACHEAL TUBE HOLDER

Walter J. Bornhorst, Acton; Steven J. Coleman, Marlboro, and James W. O'Brien, Waltham, all of Mass., assignors to Thermo Electron Corporation, Waltham, Mass.

Filed Sept. 3, 1974, Ser. No. 502,692

Int. Cl.² A61M *25/00*

U.S. Cl. 128—348 **4 Claims**



1. A tube holder for securing an endotracheal tube in its applied working position comprising:

a generally oval frame adapted to border the outside of the mouth of a subject and conform to the contour of the face around the mouth leaving the mouth substantially uncovered, said frame having an upper portion which seats above the upper lip, a lower portion which seats below the lower lip, means in the central, upper portion of said frame forming a notch and a solid bridge-like structure beneath said notch, said notch being adapted to receive the protruding end of an endotracheal tube in its applied working position;

a single elongated substantially straight platform forming a surface laterally curved to form a shallow trough for receiving the outside surface of an endotracheal tube and adapted to receive an adhesive strip wrapped around both such tube and said platform to bind such tube securely to said platform, said platform being integrally formed with said frame and extending from said bridge-like member at the base of said notch for receiving the protruding end of an endotracheal tube in its applied working position, said platform forming an obtuse angle with said bridge-like member; and

means adjacent the free end of said platform for preventing such adhesive strip from slipping off the free end of said platform.

3,976,081

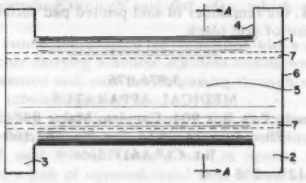
LAMINAR MIDDLE EAR VENT TUBE ASSEMBLY

Abraham Lapidot, 747 Montauk Highway, West Islip, N.Y. 11795

Filed Apr. 10, 1974, Ser. No. 459,603

Int. Cl.² A61M *27/00*; A61F *11/00*

U.S. Cl. 128—350 R **2 Claims**



1. A laminar middle ear vent tube comprising:

a. a substrate layer of from 30 to 50 mil thickness of an elastomeric resinous polysiloxane rubber in the shape of a flanged tube.

b. on the interior face of said flanged tube substrate a bonded and superimposed layer of from 2 to 10 mil thickness of polytetrafluoroethylene having impregnated a coating of from 0.01 to 0.10 mil thickness of an anticoagulant compound.

3,976,082

INTRACARDIAL STIMULATION ELECTRODE

German Schmitt, Ramertsweg 150/152, 4400 Munster, Germany

Filed Feb. 24, 1975, Ser. No. 552,716

Claims priority, application Germany, Feb. 25, 1974, 7406499[U]; July 9, 1974, 7423250[U]

Int. Cl.² A61N *1/04*

U.S. Cl. 128—418 **7 Claims**

1. An intracardial stimulation electrode for a heart pacemaker comprising:

a hollow insulating sleeve open at the rear,

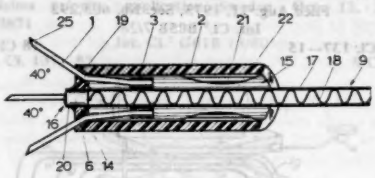
a metallic conductor head mounted at the end of said sleeve opposite the rear,

a flexible hose attached to said head in water-tight relation at said one end and extending within said sleeve,

an electrical conductor attached to said head and extending within said hose for coupling said head to a power supply,

a plurality of bristles slidingly extending through said sleeve about said head for locking said electrode into heart tissue,

a slide assembly disposed within said sleeve and about said hose for movement toward and away from said head, said



assembly mounting said bristles for movement in and out of said sleeve as said assembly is moved by a catheter inserted in the rear of said sleeve to engage said slide assembly, and

means adjacent the rear of said sleeve for preventing withdrawal of said assembly from said sleeve.

3,976,083

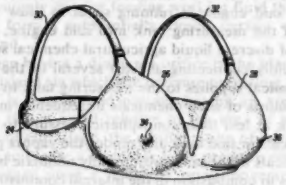
BRASSIERE HAVING SIMULATED NIPPLES

Jakob E. Schmidt, 934 Monroe St., Charlestown, Ind. 47111

Filed Feb. 27, 1975, Ser. No. 553,779

Int. Cl.² A41C *3/00*

U.S. Cl. 128—425 **8 Claims**



1. An improved brassiere comprising a pair of breast receiving cups, said cups comprising an outer layer of flexible fabric material; and a simulated nipple attached to said outer layer of each cup, said nipple comprising a stud element having distal and proximal ends and an exterior profile simulating the profile of the nipple of a human female breast, said stud element being positioned interiorly of said cup with a portion of said outer layer deformed over said distal end, and means cooperating with said proximal end and said outer layer for attaching said stud element to said breast receiving cup, whereby the exterior profile of said stud element is noticeable exteriorly of said brassiere to enhance the appearance of bralessness when said brassiere is worn beneath outer garments.

3,976,084

RETHRESHER BLOWER FOR A COMBINE

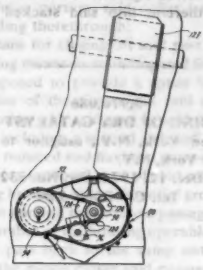
Wilbert D. Weber, Mississauga, Canada, assignor to Massey-Ferguson Industries Limited, Toronto, Canada

Filed Apr. 23, 1975, Ser. No. 570,901

Int. Cl.² A01F *12/18*

U.S. Cl. 130—27 F **4 Claims**

1. An agricultural combine harvester including a frame; a thresher housing; grain threshing, separating and cleaning apparatus including sieves mounted on the frame in the thresher housing; a conveyor mounted below said sieves for receiving tailings that overflow the sieves and conveying the tailings to one side of the combine; and a tailings rethreshing and blower assembly mounted on the frame for receiving tailings from the conveyor mounted below the sieves, for rethreshing the tailings and for blowing the rethreshed tailings back into the thresher housing for cleaning, the rethresher and blower assembly including a chamber defined by two end walls and arcuate wall sections joining the two end walls, a blower rotatably mounted between the two end walls, said blower including vanes extending outwardly from the axis of rotation of the blower, rasp bar sections detachably mounted on the outer ends of the blower vanes, stationary threshing elements mounted on at least a portion of the arcuate wall of the chamber to cooperate with the rasp bar sections on the blower vanes to rethresh tailings, a tailings inlet aperture in



said arcuate wall sections, conveyor means connecting the conveyor mounted below the sieves and the tailings inlet aperture to direct tailings from conveyor mounted below said sieves through the tailings inlet aperture and into said chamber, a threshed tailings outlet in said arcuate wall sections, conveyor means connecting the threshed tailings outlet to the thresher housing to direct rethreshed tailings from the tailings outlet in said arcuate wall sections up and into the thresher housing, at least one air intake in one of the two end walls which define the chamber, and drive means to rotate the blower.

3,976,085

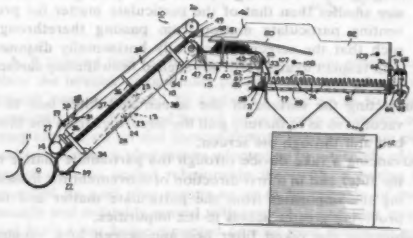
AUTOMATIC CIGARETTE FEED MACHINE

Floyd Vameda Hall, Durham, N.C., assignor to Liggett & Myers, Incorporated, Durham, N.C.

Continuation of Ser. No. 353,372, April 23, 1973, abandoned. This application Sept. 26, 1974, Ser. No. 509,702

Int. Cl.² A24C *5/35*

U.S. Cl. 131—25 **11 Claims**



1. In combination in a one-to-one relationship,

a cigarette making machine for producing cigarettes at a high rate of speed, wherein said making machine includes a means for dispensing cigarettes individually in a spaced relationship,

a cigarette packaging machine for packaging cigarettes at approximately said high speed rate, and

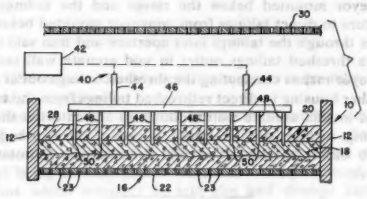
a cigarette feed machine connected between said making machine and said packaging machine to convey the cigarettes made in said making machine directly to said ciga-

rette packaging machine at a rate equal to said high speed rate, said cigarette feed machine including a first conveyor inclined with respect to a horizontal plane for receiving and conveying the cigarettes in said spaced relationship from said making machine individually to an elevated portion in a sequential series, a second horizontal conveyor extending from under said first conveyor to receive the series of cigarettes therefrom and to convey the received cigarettes in stacked fashion to said packaging machine, and means for driving said second conveyor at a speed less than the speed of said first conveyor to permit the received cigarettes on said second conveyor to accumulate thereon into said stacked fashion during conveyance.

3,976,086
CLEANING OF DRY CATALYST BEDS

Clyde Partin, New York, N.Y., assignor to The Anaconda Company, New York, N.Y.

Filed Dec. 12, 1974, Ser. No. 532,032
Int. Cl.² B08B 5/04
U.S. Cl. 134—6 4 Claims



1. A process adapted for use in cleaning impurities from a dry filter bed having particulate matter comprising the steps of:

arranging a screen having a plurality of openings being of a size smaller than that of the particulate matter for preventing particulate matter from passing therethrough such that the screen is generally horizontally disposed with respect to and vertically spaced from the top surface area of the filter bed;

subjecting the surface of the screen and filter bed to a vacuum so as to thereby pull the impurities from the filter bed and through the screen;

advancing a rake device through the particulate matter of the filter bed in a first direction of movement for loosening the impurities from the particulate matter and for providing greater access to the impurities;

subjecting the raked filter bed and screen to a vacuum device to thereby pull additional impurities from the filter bed and through the screen;

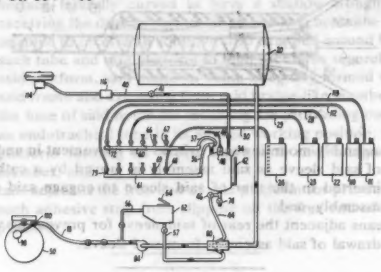
advancing the rake device through the particulate matter of the filter bed in a second direction which is substantially transverse to the first direction of movement for further loosening the impurities and particulate matter and for providing greater access to the impurities from a top surface thereof; and

subjecting the surface of the twice raked particulate matter and screen to a vacuum to thereby pull additional impurities from the filter bed and through the screen.

3,976,087
CLOSED MIXING SYSTEM FOR TENDING AGRICULTURAL SPRAYERS

Jack C. Bolton, Salinas, and Franklin L. Alexander, Hollister, both of Calif., assignors to Union Carbide Corporation, New York, N.Y.

Filed Aug. 11, 1975, Ser. No. 603,292
Int. Cl.² B05B 7/28
U.S. Cl. 137—15 18 Claims

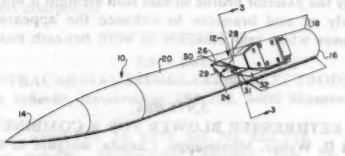


1. A closed method of measuring, batching and mixing agricultural chemicals at a vehicle such as sprayer tending truck provided with an internal combustion engine, said method comprising the steps of drawing a vacuum on a measuring tank by providing a fluid connection between the measuring tank and the intake manifold of the internal combustion engine as said engine is running so as to draw the gaseous content of the measuring tank into said engine; providing a plurality of discrete liquid agricultural chemical supplies; and serially fluidly connecting at least several of the plurality of liquid chemical supplies to the measuring tank to draw preselected amounts of such chemicals in sequence into the measuring tank at less than atmospheric pressure to accumulate the chemicals in said tank and render the vapors produced by said chemicals in the tank substantially nontoxic by subjecting said vapors to combustion in the internal combustion engine.

3,976,088
DUAL SIDE-MOUNTED INLET-VEHICLE ORIENTATION

Arthur J. Karanian, Wethersfield, and Robert L. O'Brien, Glastonbury, both of Conn., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 26, 1974, Ser. No. 492,073
Int. Cl.² H01M 4/20
U.S. Cl. 137—15.1 3 Claims



1. An airbreathing ramjet missile including:

a pair of side-mounted ram air inlets mounted on the side of the missile near the aft end, and each circumferentially positioned from the windward side meridian by an angle less than 90°;

standoff mounting means including sharp leading edge boundary layer splitter plates between said inlets and said missile; and

a cowl lip on each of said inlets chamfered back toward the outside at the top and downward on the outer-most side wall toward the windward pitch plane meridian.

3,976,089

SENSING DEVICE

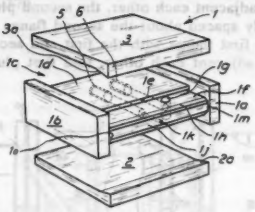
Bengt Erik Carlnäs, Bivagen, 184 00 Akersberga, and Bror Christer Ingemar Sundvall, Holmvagen 2, 194 99 Upplands Vasby, both of Sweden

Filed Oct. 3, 1974, Ser. No. 511,518

Claims priority, application Sweden, Oct. 12, 1973, 7313871

Int. Cl.² G01B 13/00

U.S. Cl. 137—83 8 Claims



1. A sensing device comprising

a. means including an elongated island with a first planar surface having a ratio of length to width within the range of 10:1 to 2:1 and a surrounding spaced wall forming a slot with said island adapted to face a surface of an object to be sensed which is many times larger than said slot and a fluid supply line for feeding working fluid through said slot to form a substantially closed curtain of working fluid, and

b. a passage having a discharge orifice in the planar surface of said island via which the pressure prevailing within said curtain is sensed, said passage having an area in cross section that is small relative to the area of said planar surface of said island, the configuration of said slot being such as to create a relatively large pressure difference in said passage upon a relatively small movement of said object toward or away from said device.

3,976,090

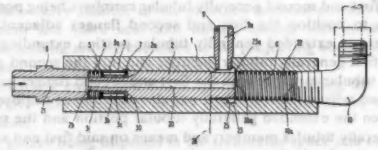
SLOW START HYDRAULIC VALVE

Philip C. Johnson, 5519 Firethorn Court, Cincinnati, Ohio 45216

Filed Feb. 25, 1975, Ser. No. 553,046

Int. Cl.² F16K 31/36, 11/00; G05D 11/03

U.S. Cl. 137—117 2 Claims



1. A slow start hydraulic valve for controlling the flow of hydraulic fluid from a source, including a sump and a pump, to a device to be controlled, comprising

a. a main housing having an inlet at a first location and an outlet at a second location, a hollow interior chamber connecting said inlet and outlet; said inlet being adapted to receive the hydraulic fluid from the pump and said outlet being adapted to discharge hydraulic fluid to the device to be controlled;

b. a sump return conduit disposed at a location between said inlet and outlet for returning hydraulic fluid within the hollow chamber to the sump;

c. a piston disposed in said hollow chamber and having a passage therein connecting said inlet and outlet;

d. said piston having a main body portion and a first reduced end portion adjacent to the inlet, said first reduced end portion being spaced from the chamber walls, said first reduced portion having a cross-sectional area less than the cross-sectional area of said main body portion;

e. a spring adjacent said outlet and urging said piston toward said inlet end, said spring having sufficient power to maintain said piston adjacent said inlet when the pump is not operating;

f. a restricter comprising a collar surrounding said first reduced piston portion, said collar having at least one port extending therethrough;

g. closure means for closing off said port in said collar;

h. retaining ring means surrounding said first reduced piston portion disposed to provide a space between the main body portion of the piston and said collar, said space communicating with said port in said collar;

i. said piston including a second reduced end adjacent said outlet; said reduced end having a cross-sectional area less than the cross-sectional area of said main body portion;

j. said housing having a circumferential groove adjacent said sump return conduit to provide a passage from the hollow interior chamber of the housing operable to allow hydraulic fluid to pass back to the sump until the main body portion of the piston closes said passage,

Whereby hydraulic fluid pumped into the inlet urges said piston toward said outlet and a portion of the hydraulic fluid passes into the sump return conduit through said groove until the main body portion of the piston passes said groove, whereupon the full flow of the hydraulic fluid passes through the outlet to the device being controlled.

3,976,091

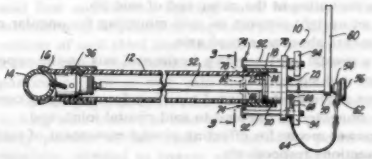
PIPE TAPPING TOOL

Walter C. Hutton, 10360 Peach Ave., Hesperia, Calif. 92345

Filed May 29, 1975, Ser. No. 581,826

Int. Cl.² F16K 43/00

U.S. Cl. 137—318 4 Claims



1. A tapping tool for boring a hole in a main pipe so as to place the interior of said main pipe in communication with a branch pipe connected to said main pipe so as to extend outwardly therefrom and having an outwardly extending coupling located on an end thereof remote from said main pipe, said tool having a plug means adapted to fit internally of said branch pipe in sealed relationship therewith, a boring bar mounted on said plug means so as to be capable of being linearly and rotatably moved with respect to said plug means, said boring bar being mounted on said plug means so as to extend through said plug means and so as to be capable of being moved through said branch pipe when said plug means is located within said branch pipe, a mounting member secured to said plug means and extending outwardly therefrom for engagement with said coupling and holding means carried by said mounting means for securing said tool to said branch pipe in which the improvement comprises:

said holding means comprising two yokes and a fastener securing each of said yokes to said mounting means,

each of said yokes having two arms defining a semicircular interior capable of fitting closely around a part of the

exterior of said branch pipe, each of said yokes including locking means on the extremities of the arms thereof, said locking means being capable of interfitting so as to hold said yokes relative to one another so that said yokes surround said branch pipe, said fasteners connecting the bases of said yokes with said mounting means.

3,976,092

APPARATUS FOR THE DISTRIBUTION OF CONCRETE

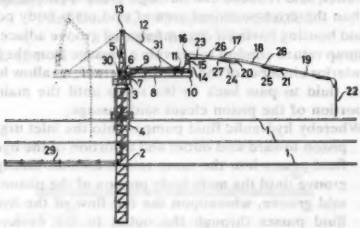
Joachim Coja, Gelsenkirchen; Karl-Ernest von Eckardstein, Kamen, and Bernhard Meinken, Haltern, all of Germany, assignors to Friedrich Wilhelm Schwing GmbH, Wanne-Eichel, Germany

Filed Mar. 19, 1975, Ser. No. 559,834

Claims priority, application Germany, July 6, 1974, 2432581

Int. Cl.² B67D *5/36, 5/60, 5/64*

U.S. Cl. 137—343 **3 Claims**



1. Concrete distributing apparatus comprising

a. a crane tower,

b. a rotation track ring on the upper end of said tower,

c. an upwardly extending mast on said track ring for rotation about a vertical axis,

d. a joint having a horizontal axis on the lower end of said mast,

e. a jib attached at its inner end to said joint,

f. a mounting at the outer end of said jib,

g. an upright support on said mounting for angular movements about a vertical axis,

h. a pivotal joint having a horizontal axis on the upper end of said support,

i. an articulated sectional pipe line for conveying concrete connected at one end to said pivotal joint, and

j. power means for effecting pivotal movement of said pipe sections respectively.

3,976,093

PIPE COUPLING APPARATUS

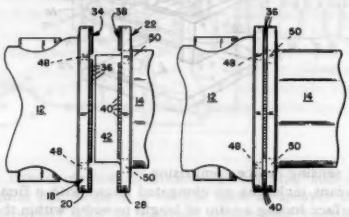
Gail Cornelius, Portland, Oreg., assignor to R. M. Wade & Co., Portland, Oreg.

Filed June 21, 1974, Ser. No. 481,488

Int. Cl.² A01G *25/02;* **B05B** *15/06*

U.S. Cl. 137—344 **8 Claims**

1. In an irrigation system including an irrigation line rotatable about the longitudinal axis thereof upon application of rotational torque thereto, and means connected to the line applying said rotative torque thereto, wherein said irrigation line comprises a plurality of generally tubular members, coupling means joining first and second generally tubular members of the irrigation line comprising: a first flange defining a circular outer periphery and fixed relative to the first generally tubular member adjacent one end thereof; a second flange defining a circular outer periphery and fixed relative to the second generally tubular member adjacent one end thereof, the first and second generally tubular members being positionable to position the first and second flanges adjacent each other; an extended generally tubular portion extending from the first generally tubular member and into the second generally tubular member with the first and second flanges so positioned adjacent each other; annular seal means disposed between the extended generally tubular portion and the second generally tubular member; and means on said first and second flanges selectively securing the same together when so positioned adjacent each other, said first flange defining a first plurality of projecting teeth, and said second flange defining a second plurality of projecting teeth, said first plurality of teeth being evenly spaced about said first flange and extending toward the second flange with the first and second flanges so positioned adjacent each other, the second plurality of teeth being evenly spaced about the second flange and extending toward the first flange with the first and second flanges so positioned adjacent each other, said first plurality of teeth

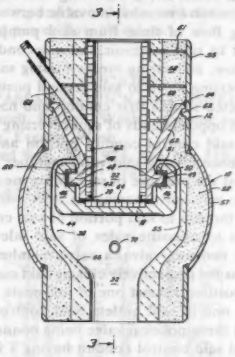


being in meshing engagement with said second plurality of teeth with the first and second flanges so positioned adjacent each other, and wherein the means for selectively securing the first and second flanges relatively together comprises a plurality of bolts, each disposed through an aperture defined by one of the first and second flanges, and an aperture defined by the other of the first and second flanges, said apertures defined by the other of the first and second flanges being elongated generally along an arc having as its center the longitudinal axis of the generally tubular member to which said other of the first and second flanges is fixed, and a plurality of nuts, each threadably engaged with a bolt.

5. In an irrigation system including an irrigation line rotatable about the longitudinal axis thereof upon application of rotational torque thereto, and means connected to the line applying said rotative torque thereto, wherein said irrigation line comprises a plurality of generally tubular members, coupling means joining first and second generally tubular members of the irrigation line comprising: a first flange defining a circular outer periphery and fixed relative to the first generally tubular member adjacent one end thereof; a second flange defining a circular outer periphery and fixed relative to the second generally tubular member adjacent one end thereof, the first and second generally tubular members being positionable to position the first and second flanges adjacent each other; an extended generally tubular portion extending from the first generally tubular member and into the second generally tubular member with the first and second flanges so positioned adjacent each other; annular seal means disposed between the extended generally tubular portion and the second generally tubular member; and means on said first and second flanges selectively securing the same together when so positioned adjacent each other, said first flange defining a first plurality of projecting teeth, and said second flange defining a second plurality of projecting teeth, said first plurality of teeth being evenly spaced about said first flange and extending toward the second flange with the first and second flanges so positioned adjacent each other, the second plurality of teeth being evenly spaced about the second flange and extending toward the first flange with the first and second flanges so positioned adjacent each other, said first plurality of teeth being in meshing engagement with said second plurality of teeth with the first and second flanges so positioned adjacent each other and wherein the said means on said first and second flanges for selectively securing the same relative to one

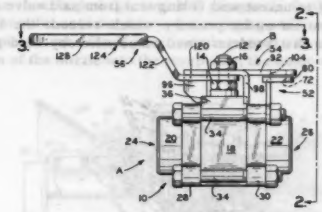
another comprises removable clamp means configured to encircle the first and second flanges.

3,976,094
GUIDED SLIDE VALVE
Frank J. Jandrasi, and Howard A. Purvis, both of Houston, Tex., assignors to Tapco International, Inc., Houston, Tex.
Filed Jan. 13, 1975, Ser. No. 540,680
Int. Cl.² F16K 3/00
U.S. Cl. 137—375 16 Claims



1. A guided slide valve comprising,
a body provided with a flow passage therethrough, including an enlarged internal portion,
a body portion connected at one end to the body and having a projecting portion extending into the enlarged internal portion, the projecting portion having its sides spaced from internal walls of the enlarged internal portion thereby forming a transverse space on each side of the projecting portion out of direct flow through the flow passage,
a valve seat secured on the projecting portion,
a slide valve slidable in the enlarged internal portion adjacent the valve seat and having spaced side members extending around the sides of the projecting body portion and disposed in the transverse space,
interfitting guides and slides operable for guiding the slide valve into open and closed positions adjacent the valve seat,
the guides being disposed in the transverse space and on the sides of the projecting body portion,
the interfitting slides being disposed on the side members,
the side members, guides and slides, being spaced from the internal walls of the enlarged internal portion and out of the direct flow through the flow passage,
whereby the side members, interfitting guides and slides being out of direct contact with the body thereby permit external settable clearances between the valve seat and the slide valve which remain fixed under temperature or pressure excursions,
the body provided with an opening of a size permitting insertion in and withdrawal from the body of the slide valve, the side members and the slide therethrough, and
a removable cover closing the opening

3,976,095
OPERATING MEMBER LOCKING DEVICE
Ulrich H. Koch, Moraga, and Thomas A. Voudy, San Pablo, both of Calif., assignors to Whitey Research Tool Co., Emeryville, Calif.
Filed June 9, 1975, Ser. No. 584,717
Int. Cl.² F16K 35/06
U.S. Cl. 137—385 15 Claims

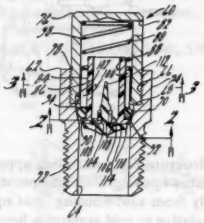


1. A locking structure for controlling apparatus of the type having an apparatus housing with an operating member protruding outwardly from said housing, said operating member being rotatable relative to said apparatus housing between two extreme positions for adjusting said apparatus, said locking structure comprising:
a separate lock plate having a mounting portion and a locking portion, said lock plate being rigidly mounted to said apparatus housing by said mounting portion with said locking portion disposed in a plane generally normal to the longitudinal axis of said operating member, said locking portion having at least first and second spaced apart locking holes therein; and,
a lock tab having a body portion and a tab portion, said body portion having a mounting opening therein adapted to be closely received over said operating member, said tab portion extending outwardly of said body portion in a plane generally parallel and closely spaced to the plane of said lock plate locking portion and including a third locking hole therein adapted for selective registry with said first and second locking holes whereby a locking member may be passed through one of the aligned combinations of said third and first and said third and second locking holes for locking said operating member in a particular position with said first and second locking holes being spaced apart such that registry with said third locking hole occurs at said two extreme positions, said body portion of said lock tab including positive stop members adapted to engage said apparatus housing for determining said extreme positions, said positive stop members comprising a pair of spaced apart downwardly depending members with one of said members engaging said apparatus housing in one extreme position of said operating member and the other of said pair engaging said apparatus housing at the other extreme position of said operating member.

3,976,096
VALVE
Gerald H. Kass, deceased, late of Garden City, Mich., by Frederick O. Knauer, administrator, Detroit, Mich., assignors to Anderson Brass Company, Detroit, Mich.
Division of Ser. No. 390,101, Aug. 20, 1974, abandoned. This application Dec. 18, 1974, Ser. No. 533,936
Int. Cl.² F16K 17/04, 17/18
U.S. Cl. 137—493.2 7 Claims

1. A fluid flow-controlling valve comprising valve body, a central cylindrical bore in said body with one end thereof being the normal valve inlet and the other end the normal valve outlet, a valve seat extending around said bore, a hollow cylindrical relief valve element coaxial with and arranged for

axial displacement within said bore, said relief valve element having an axial passage therein, an end wall at one end of said relief valve element extending transversely of the passage thereof, the other end of said relief valve element passage being open, a groove extending around the outside of said relief valve element, an O-ring seal in said groove, a coil spring for biasing said relief valve element to seat said seal on said valve seat and yieldably oppose reverse flow through said valve, said relief valve element being displaced against the bias of said spring to unseat said O-ring seal from said valve seat in response to an outlet pressure which exceeds the inlet pressure by a first predetermined value whereby fluid may



flow from said valve outlet to said valve inlet, an opening extending through said end wall of said relief valve element, an elastomeric check valve element carried by said end wall and including a supporting portion projecting through said end wall to the interior of said passage and cooperable with said opening to permit fluid flow from the valve inlet to the valve outlet when the inlet pressure exceeds the outlet pressure, and a second valve seat for said O-ring seal spaced from said first-mentioned seat and against which said O-ring seal is seated when the outlet pressure exceeds the inlet pressure by a second predetermined value which is greater than said first predetermined value to thereby cooperate with said check valve to block flow through the valve in both directions.

3,976,097

HYDRAULIC CONTROL ARRANGEMENT

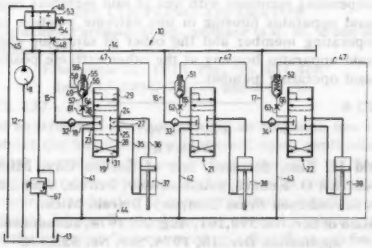
Kornelius Brakel, Schwieberdingen, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Dec. 4, 1975, Ser. No. 637,855

Claims priority, application Germany, Dec. 5, 1974, 2457451

Int. Cl.² F15B *13/04*

U.S. Cl. 137—596.13 **9 Claims**



1. Hydraulic control arrangement for controlling a flow of fluid from a pump to a consumer device independent of the load acting on the latter and from the consumer device to a reservoir, comprising, in combination, a three-position valve having an inlet connection, a return flow connection, first and second consumer device connections and a control circuit connection, said three-position valve having a valve member movable between a neutral position preventing flow between the inlet connection to at least one of said consumer device connections, a first working position connecting said inlet connection with the first consumer device connection and said second consumer device connection with said return flow connection, and a second working position connecting said inlet connection with said second consumer device connection and said first consumer device connection with said return flow connection; a first conduit connecting the pump with said inlet flow connection; a second conduit connecting said first consumer connection with said consumer device; a third conduit connecting said second consumer connection with said consumer device; a fourth conduit connecting said return flow connection with the reservoir; a bypass conduit connecting said first conduit upstream of the three-position valve with said reservoir; a reversing valve in said bypass conduit having a valve member movable between a first position permitting flow of fluid from said pump through said bypass conduit to said reservoir and a second position preventing such flow, and spring means biasing said valve member of said reversing valve to said second position; a control conduit connected to said first conduit and having a portion connected with opposite ends of said reversing valve; a throttle located in said control conduit portion and producing a pressure difference biasing said valve member of said reversing valve against the pressure of said spring means to said first position; a two-way valve having an inlet connected downstream of said throttle to said portion of said control conduit, a pair of seats to opposite sides of said inlet and forming outlets of said two-way valve, a valve member movable between said seats for respectively closing said outlets and abutting in a rest position against one of said seats for closing the corresponding one of said outlets, said control conduit connection to said three-position valve being connected with said one outlet, and said control conduit having a further portion connecting the other outlet of said two-way valve with said reservoir, said control conduit connection of said three-position valve being in at least one of said working positions of the latter connected with one of said consumer connections which is connected in this position of the three-position valve with said inlet connection.

3,976,098

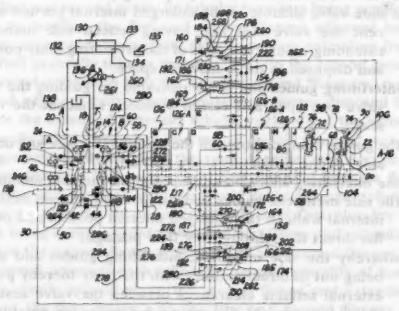
HYDRAULIC MOTOR CONTROL APPARATUS

Robert E. Raymond, Zanesville, Ohio, assignor to International Basic Economy Corporation, New York, N.Y.

Filed Jan. 2, 1974, Ser. No. 430,047

Int. Cl.² F16K *11/10*

U.S. Cl. 137—608 **25 Claims**



1. A universal directional valve programmable for all valving functions, said apparatus comprising, in combination, a power flow module for controlling the power flow from a pump to a fluid motor, said module comprising two identical

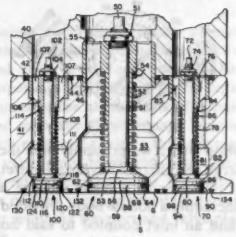
independently controllable power flow elements, each of said power flow elements being shiftable between "neutral", "forward", and "reverse" positions by pressure signals from two signal flow ports; power flow ports in said power flow module for connection with said pump, fluid motor, and a reservoir; a standard power flow module interface on said power flow module and including standardized signal flow porting communicating with said signal flow ports; and an infinitely programmable modular signal flow valve system including a standard signal flow module interface mounted on said power flow module interface and including standardized signal flow porting that registers with said signal flow porting of said power flow module interface, and said signal flow valve system including standard selectively programmable modules provided with a common standard interface, port and duct configuration, standard selectively programmable valve spool configuration, and associated control elements, said signal flow valve system serving to control signal flows of fluid through said signal flow porting and to and from said control ports to effect control of said power flow elements.

3,976,099

MULTIPLE-PASSAGE, QUICK-DISCONNECT COUPLING

Duane K. Russell, Bothell, Wash., assignor to Western Gear Corporation, Everett, Wash.

Filed Sept. 30, 1974, Ser. No. 510,472
Int. Cl.² F16L *29/00*
U.S. Cl. 137—614.01 **13 Claims**



9. A quick-disconnect coupling comprising:

a supply assembly having a plurality of axial first ports, each sealed by a supply valve which opens by moving axially outward,

a receiver assembly having a plurality of axial second ports each sealed by a receiver valve which opens by moving axially inward and adapted to be rigidly interlocked with said supply assembly, with said first and second ports in axial alignment,

said supply valve when in an opened position extending axially into said receiver assembly beyond the closed position of the receiver valve such that extending the supply valve will push open the receiver valve,

means for passing pressurized fluid to said supply valves for opening said supply valves and extending the valves with the pressurized fluid into engagement with said receiver valves and thereby also opening said receiver valves, and

means for passing pressurized fluid past said opened valves.

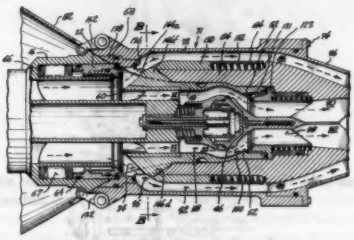
3,976,100

AERIAL REFUELING APPARATUS

Richard E. Souslin, Seattle, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed May 13, 1974, Ser. No. 469,094
Int. Cl.² F16L *29/00*
U.S. Cl. 137—614.03 **27 Claims**

1. Sectional, aerial refueling apparatus comprising a nozzle unit and a receptacle unit, the nozzle having a probe-like forward segment and the receptacle having a cavity opening to the rearward end thereof into which cavity the forward segment of the nozzle is insertable, each of said units having an inner fuel passage and an outer fuel passage, said inner and outer nozzle passages merging into a common main fuel passage at the rear of said nozzle, and said inner and outer receptacle passages merging into a common main passage disposed adjacent the forward end of said receptacle, the inner nozzle passage terminating in an inner nozzle port in the forward end of the nozzle, and a forwardly biased, inner nozzle poppet valve adjacent the inner nozzle port for normally closing the inner nozzle passage, and the receptacle further having an inner valve actuator means for engaging and causing rearward displacement of said inner nozzle poppet valve during insertion of the nozzle into the receptacle, the outer nozzle passage



extending through the side of the nozzle and terminating there in an outer nozzle port spaced rearwardly from the inner nozzle port, the inner receptacle passage terminating in an inner receptacle port at the forward end of the receptacle cavity and the outer receptacle passage terminating in an outer receptacle port spaced rearwardly from the inner receptacle port along the side of the cavity, the inner ports and outer ports of the units being so disposed that upon full insertion of the nozzle into the receptacle the inner passages intercommunicate to form an inner composite fuel passage and the outer passages intercommunicate to form an outer composite fuel passage with both said inner and outer composite fuel passages communicating with said main fuel passages during said full insertion.

3,976,101

AUTOMATIC TIMER DEVICE FOR WATER SOFTENERS OR THE LIKE

Ronald M. Bassett, 2107 Summerdale, Chicago, Ill. 60625

Filed Jan. 12, 1976, Ser. No. 648,14?
Int. Cl.² G05B *19/06*; G04C *23/26*
U.S. Cl. 137—624.2 **12 Claims**

1. An automatic timer device adapted for turning on and off a valve of an automatic system and being adapted to be programmed for automatic operation over an extended period of time, said device comprising:

a. a base;

b. a first shaft mounted on said base;

c. a second shaft mounted on said base spaced apart from and substantially parallel to said first shaft,

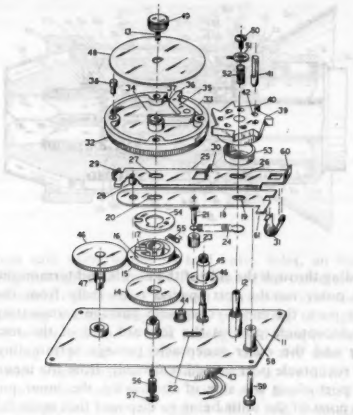
d. a first circular gear rotatably mounted on said first shaft;

e. a second circular gear rotatably mounted on said common shaft above said first circular gear and normally independently rotatable with respect to first gear, said second circular gear having an upper portion thereof defining a circular peripheral cam surface having a detent recess at a portion thereof defining a terminal detent position;

f. a first elongate slide lever having an elongate slot at one end and having said first shaft disposed therein, and an elongate slot at the other end having said second shaft disposed therein, said first slide lever having a stud affixed thereto extending downwardly and disposed in an elongate slot provided in said base, and a pinion gear rotatably

mounted on said stud, and spring means biasing said first slide lever toward said first shaft;

g. a second elongate slide lever slidably mounted over said first slide lever having an elongate slot at one end having said first shaft disposed therein and an elongate slot at the other end having said second shaft disposed therein, a stud affixed at one end of said second slide lever engaging the cam surface of said second circular gear, a timing gear-engaging flange directed upwardly at one end of said second slide lever and a calendar wheel pin-engaging means at another portion of said second slide lever, said first and second slide levers being spring-biased in a longitudinal direction away from each other and both being movable longitudinally with respect to said first and second shafts;



h. a circular timing gear rotatable mounted on said second shaft having an axially extending rim defining a pawl chamber, a pawl mounted therein having an outwardly spring-loaded pawl tooth extending through a recess in said rim and adapted to retract upon application of force thereto, a pin mounted near the periphery of said timing gear extending downwardly and adapted to engage the timing gear pin-engaging flange of said second slide lever;

i. a calendar gear wheel rotatably mounted on said first shaft having a plurality of ratchet teeth provided at the periphery thereof and a plurality of pins slidably mounted in apertures provided in said wheel adapted to be alternatively placed in upwardly oriented inoperational position or in downwardly oriented operational position;

j. a motor mounted on said base having speed reduction means terminating in an output pinion gear positioned in gear engagement with said first circular gear;

k. reduction gear means mounted on said base having a larger circular gear engaging said output pinion gear and having coaxially and upwardly mounted a pinion gear of smaller radius than said larger circular gear, said pinion gear being operatively engaged with said timing gear, and;

l. a valve-operating circular gear having a shaft affixed at the center thereof rotatably journaled in said base, said shaft being adapted to engage and operate a valve,

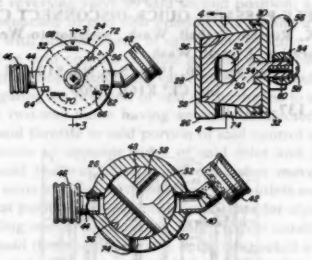
whereby when said motor operates through said output pinion and rotates said reduction gear means and causes said circular timing gear to rotate, said pawl tooth engages a ratchet tooth of said calendar wheel and rotates it, thereby causing a calendar wheel pin in the operable position to engage the pin-engaging means of said second slide lever and to move said slide lever longitudinally thereby placing said timing gear pin-engaging flange in engageable postion, the timing gear pin thereby engaging said flange and moving said second slide further until the stud thereof leaves said detent recess and rides on the circular cam surface of said second gear and causing said first slide-supported pinion gear to move into engagement with both said first and said second circular gears, causing said second circular gear to rotate until it has made a full revolution, said second circular gear engaging and rotating said valve operating gear and thereby rotating said valve operating gear shaft to cause a valve connected thereto to be opened and closed during rotation, whereupon at the end of the revolution of said second gear said stud riding on said cam surface once more enters said detent recess, thereby disengaging said second circular gear from said first circular gear.

3,976,102

HOSE BIB SELECTOR VALVE WITH HOSE DRAINING FEATURE

Nathan E. Crocker, 2019 Azalea Drive, Goldsboro, N.C. 27530

Filed Apr. 25, 1975, Ser. No. 571,759
Int. Cl.² F16K *11/083*
U.S. Cl. 137—625.47 **5 Claims**



1. In combination with a water supply pipe including a hose bib on the discharge end thereof having an outlet, a water hose having inlet and outlet ends, a selector valve assembly, said valve assembly including a hollow body provided with first and second outlets and an inlet coupled to said hose bib outlet, means sealingly connecting said inlet end of said water hose to first outlet of said body, said valve assembly including a valve element shiftable between first, second and third positions and including means operative (1) when in said first position, to communicate said valve body inlet with said valve body second outlet and to block communication between said valve body first outlet and said valve body second outlet and valve body inlet, (2) when in said second position to communicate said valve body inlet with said valve body first outlet and block communication between said valve body second outlet and said valve body inlet and first outlet and (3) when in said third position to communicate said valve body first and second outlets and to block communication between said valve body inlet and said valve body first and second outlets.

3,976,103

SLIDING SPOOL TYPE VALVE AND METHOD OF MAKING THE SAME

Alonzo M. Ostic, Rockford, Ill., assignor to Rockford Servo Corporation, Rockford, Ill.

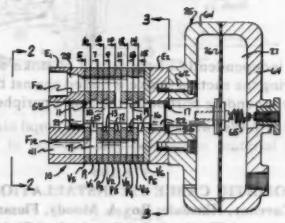
Filed Oct. 19, 1973, Ser. No. 408,191
Int. Cl.² F15B *13/04*
U.S. Cl. 137—625.69 **17 Claims**

1. In a sliding spool type valve including a valve body and a valve spool slidable in the body, the improvement wherein said valve body comprises:

a. a plurality of flat valve plates of like configuration each having a central valve opening therethrough and a number *n* of flow passage openings arranged at a uniform preselected radial distance from the center of the valve opening at positions angularly spaced apart *n*/360°,

b. a plurality of flat port plates of like configuration each having a central port opening therethrough larger than said valve openings and a number $n - 1$ of flow passage openings arranged at said uniform radial distance from the center of the port opening at positions angularly spaced apart $(360°/n)$, and a through transfer passage opening extending outwardly from the port opening at least said preselected radial distance from the center of the port opening but less than the distance to the outer periphery of the port plate at a position angularly spaced $(360°/n)$ from the positions of two adjacent ones of the flow passage openings in the port plate,

c. the port and valve plates being arranged in alternate succession in a stack, the valve plates being angularly positioned relative to each other to have their flow pas-



sage openings arranged in axially aligned sets, the port plates being angularly positioned relative to the valve plates and relative to each other to have the transfer passage openings in the port plates registering with respective ones of the aligned sets of openings in the valve plates and with the flow passage openings in the port plates each registering with a flow passage opening in an adjacent valve plate to provide a number n of flow passages extending lengthwise of the stack, equal to said number n of flow passage openings in the valve plates,

d. means for retaining the port and valve plates in an assembled stack,

e. the valve spool extending lengthwise of the stack through the port and valve openings for controlling flow therethrough, the term n at each occurrence herein being a whole number no less than three.

3,976,104

COMPLETELY, DRAINING, NONLEAKING PNEUMATIC VALVE

Thomas J. Kehoe, Fullerton, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.

Filed Sept. 27, 1973, Ser. No. 401,162

Int. Cl.² F15D *1/02*

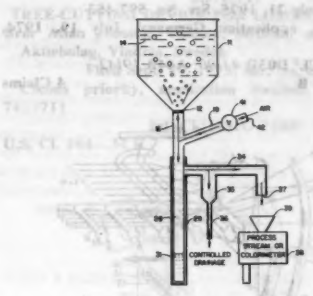
U.S. Cl. 137—806 **7 Claims**

1. A fluid operated valve for interrupting the transfer of liquid by gravity from the outlet of a vessel into a receptacle comprising:

a. a first conduit having a first end connected to the outlet of the vessel and a second end disposed to direct the liquid into the desired receptacle therefor;

b. a second conduit connected to said first conduit between said first end and said second end, said second conduit being connected to an interruptable source of fluid under pressure equal to or greater than the pressure of the liquid in the vessel at the outlet of the vessel; and,

c. means disposed between said connection of said second conduit into said first conduit and said second end of said first conduit for restricting the flow of said fluid through the portion of said first conduit between said connection and said second end whereby a portion of said fluid will be required to pass from said first conduit into the vessel through the outlet of the vessel at a pressure greater than the pressure of the liquid in the vessel at the outlet of the vessel and at a flow rate sufficient to prevent the liquid in



the vessel from passing from the vessel into said first conduit.

3,976,105

DEVICE FOR FILLING YARN BOBBINS ON THE SHUTTLES OF A TRAVELING WAVE LOOM

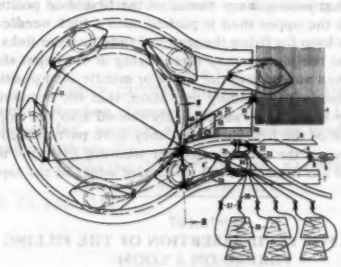
Alois Steiner, Rieden, Switzerland, assignor to Ruti Machinery Works Ltd., Ruti, Switzerland

Filed Apr. 1, 1975, Ser. No. 564,035

Claims priority, application Switzerland, Apr. 24, 1974, 5637/74

Int. Cl.² D03D *47/26, 45/00*

U.S. Cl. 139—436 **13 Claims**



1. A device for the filling of the filling yarn bobbins on shuttles of a traveling wave loom, which comprises a continuously rotating conveying chain means for moving shuttles having empty bobbins from the outlet edge of the fabric being woven to the inlet edge thereof, said shuttles being guided between slide rails, said bobbins being provided with a toothed wheel that meshes with a circular gear toothed member to bring about the rotation of the bobbins as the shuttles are conveyed around said gear toothed member for winding onto each of said bobbins a supply of filling yarn, said conveying chain means and said slide rails for the shuttles extending around said gear toothed member which can be rotated at variable speed relative to the speed of said conveying chain means and said shuttles, wherein the means for supplying the filling yarns to the bobbins stationarily arranged on the side of said slide rails.

3,976,106

METHOD OF MAKING A SLIDE FASTENER

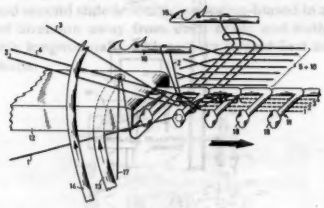
Bernd Porepp, Ortsteil Wangen, Am Rebberg 16, 7763 Oehningen, Germany

Filed July 21, 1975, Ser. No. 597,453

Claims priority, application Germany, July 19, 1974, 2434978

Int. Cl.² D03D 41/00; A44B 19/42

U.S. Cl. 139—384 B 4 Claims



1. A method of weaving a slide fastener tape, in which a helical series of slide fastener links is fed parallel to warp threads and filling threads are inserted to weave the tape, characterized in that the helical series of slide fastener links is extended along the plane of warp threads and is moved along a straight line without formation of a shed during the weaving operation, in that at least two joining warp threads are provided and are vertically spaced from the series of slide fastener links and are disposed adjacent the coupling surfaces thereof, that warp threads forming the woven backing fabric extend adjacent the other side of the series of slide fastener links, that said two joining warp threads are moved into upper and lower shed positions to form a first shed while the warp threads forming the woven backing fabric and any remaining joining warp threads lying in a middle shed position and the lower shed position form a second shed, that a double pick weft for weaving the tape is inserted into the second shed and at the same time that joining warp thread of the first shed position which lies in the upper shed is pushed onto a tuck needle to form a chain loop for fixing the series of slide fastener links to the tape, that the joining warp thread lying in the upper shed position is then moved into the lower or middle shed position during a subsequent shedding operation, that the remaining joining warp threads are successively moved into the upper shed position of the first shed after they have participated in the formation of the second shed for weaving the tape, and that selvages are formed at the respective edges of the tape.

3,976,107

DEVICE FOR FLUID INSERTION OF THE FILLING THREAD ON A LOOM

Charles Karcher, Kusnacht, Switzerland, assignor to Ruti Machinery Works Ltd., Ruti, Zurich, Switzerland

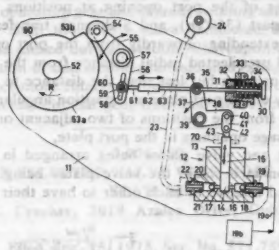
Filed Apr. 1, 1975, Ser. No. 564,036

Claims priority, application Switzerland, Apr. 18, 1974, 5353/74

Int. Cl.² D03D 47/32

U.S. Cl. 139—435 7 Claims

1. Device for fluid insertion of a filling thread on a loom, comprising a pump having a reciprocating piston for drawing in fluid and for delivering the fluid which has been drawn in from the pump to a filling thread insertion nozzle, a spring means operatively connected with the piston of the pump to produce the discharge stroke of the piston, a driven cam operatively connected to the drive mechanism of the loom, a feeler roller cooperating with the periphery of the cam and a transmission mechanism operatively connecting the feeler roller and the spring means to the piston of the pump to produce the suction stroke of the piston against the action of the spring means during the rotation of the cam, wherein in order to vary the length of stroke of the piston of the pump, the transmission mechanism has a pivotable lever with means to produce a variable adjustable lever transmission ratio and



wherein, independently of the length of stoke set, the feeler roller during the suction stroke is biased against the cam along the entire ascending portion of the cam's periphery under the action of said spring means.

3,976,108

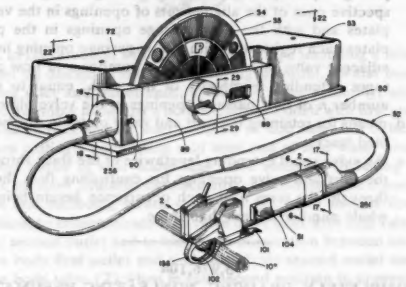
AUTOMATIC CABLE TIE INSTALLATION TOOL

Jack E. Caveney, Hinsdale; Roy A. Moody, Flossmoor; Ronald T. Fulton, and Charles J. Rehling, both of Tinley Park, all of Ill., assignors to Panduit Corporation, Tinley Park, Ill.

Division of Ser. No. 450,523, March 12, 1974. This application Dec. 18, 1974, Ser. No. 533,912

Int. Cl.² B21F 9/02

U.S. Cl. 140—93 A 34 Claims



1. An automatic cable tie installation tool for fastening a cable tie about a bundle of wires or the like comprising a tool member, a dispenser member spaced from said tool member and a conveyer member interconnecting said tool member and said dispenser member for transmitting a cable tie from said dispenser member to said tool member, said dispenser member not being supported by said tool member.

3,976,109

DISPERSING METHOD AND APPARATUS FOR METERING THE DISPERSING OF DRY PARTICULATE MATERIAL INTO A LIQUID

James B. Bailey, Pleasantville, Pa., assignor to Quaker State Oil Refining Corporation, Oil City, Pa.

Filed Dec. 18, 1974, Ser. No. 533,895

Int. Cl.² B65B 3/04

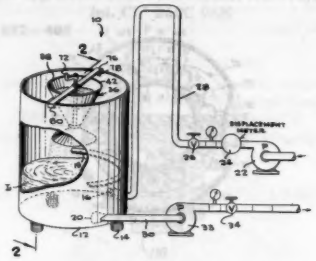
U.S. Cl. 141—9 33 Claims

11. A method of dispersing dry particulate material into a container of liquid comprising:

providing a downwardly inclined surface below a supply container having a bottom opening and containing said material,

selectively metering the material through said opening and onto said inclined surface,

permitting said material to move along said surface to the outside perimeter thereof and fall into the container of liquid, in a preselected pattern,



agitating said liquid to move substantially along said pattern whereby to mix said dry particulate material with said liquid.

3,976,110

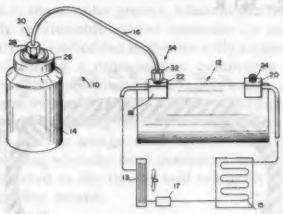
REFRIGERANT CHARGING KIT

Kenneth R. White, c/o K-Whit Tools, Inc., 5144 E. 65th St., Indianapolis, Ind. 46220

Filed Jan. 21, 1974, Ser. No. 435,319

Int. Cl.² B65B *1/04*

U.S. Cl. 141—346 **3 Claims**



1. A do-it-yourself charging kit for charging an automobile air conditioning system comprising: a pressurized can containing a supply of refrigerant; a delivery hose for connecting the can to the system; a delivery connector on the hose for first fixedly coupling one end of said delivery hose to the air conditioning system, said connector containing a one-way valve closing in the direction of flow from the connector to the hose so as to permit refrigerant flow into the system from said delivery hose but to prevent backflow from the system into said delivery hose, and means for subsequently coupling the other end of said delivery hose to said can and adapted to open said can when coupled therewith to permit the contained refrigerant to flow outward therefrom through said delivery hose and into the system under the can pressure, wherein said delivery connector comprises an outer sleeve having an end opening, a conical internal surface diverging from said end opening, and a cylindrical internal surface at the large end of the conical surface, a hose tube extending into said opening, through said conical portion and at least partially into said cylindrical portion, a bullet-shaped insert having a conical nose pressed into the end of the hose tube, expanding the same into a flared portion between the conical surface and the nose of said insert, the sleeve being internally threaded for reception on a nipple, the insert being arranged to be thrust axially by the nipple to clamp the flared portion of the tube between the nose of the insert and the conical surface of the sleeve.

3,976,111

TREE-CUTTING DEVICE FOR LUMBERING MACHINE

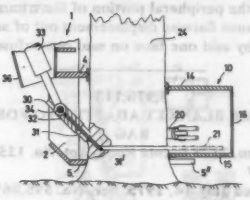
Bror Allan Jonsson, Vindeln, Sweden, assignor to Cranab Aktiebolag, Vindeln, Sweden

Filed Sept. 17, 1975, Ser. No. 614,296

Claims priority, application Sweden, Oct. 31, 1974, 7413711

Int. Cl.² A01G *23/08*

U.S. Cl. 144—34 R **7 Claims**



1. A tree-cutting device for lumbering machines of the kind comprising a holder adapted to be moved up to and pressed against the trunk of a tree to be felled, a chain saw pivotally mounted in said holder to swing in a substantially horizontal plane relative thereto, said chain saw having a protected position of rest and being operable, when swung out therefrom, to saw through the tree trunk only partially from one side thereof for then to return to said protected position of rest, and a sharp-edged cutting blade guided in said holder to move in a predetermined plane relative thereto, said cutting blade being operable to penetrate into the tree trunk from generally the opposite side thereof for cutting off the remainder of the trunk left by the chain saw to thereby finally separate the trunk from the root, wherein the plane of movement of said cutting blade forms an oblique angle to the plane of swing of said chain saw and intersects said latter plane at least approximately along the line to which the chain saw reaches during its operative stroke.

3,976,112

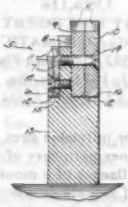
REFUSE CUTTER AND TRIM SAW UNIT

Peter C. Rowlson, Eugene, Oreg., and Ronald J. Schneider, Jasper, Ind., assignors to North American Products Corporation, Atlanta, Ga.

Filed Oct. 22, 1975, Ser. No. 624,958

Int. Cl.² B27B *33/20*

U.S. Cl. 144—223 **7 Claims**



1. A combination circular refuse and trim saw unit of the type comprising a plurality of disc-like cutting elements, each having circumferentially spaced teeth around its periphery, said cutting elements being coaxial and axially juxtaposed, with a smallest diameter cutting element at one axial end of the unit and comprising a trimming cutter, the remaining elements being thicker and larger diameter refuse cutters that

are of stepwise increasing diameter with increasing axial distance from the trimming cutter, said unit being characterized by:

A. one of said refuse cutters comprising an integral portion of a body that also has a coaxial cylindrical portion projecting axially beyond one face of said refuse cutter;

B. the trimming cutter being annular and closely surrounding said cylindrical portion to be confined against radial displacement by it; and

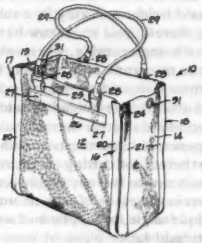
C. circumferentially spaced securement means extending parallel to the axis of the unit through the trimming cutter and into said body, said securement means being nearer to the periphery of the trimming cutter than to the axis of the unit so that the peripheral portion of the trimming cutter is confined against flatwise displacement out of an orientation established by said one face on said one refuse cutter.

3,976,113

CONVERTIBLE BLANKET ADAPTED TO FORM A TOTE BAG

Whan Jong Kim, 2175 Decoto Road, Apt. No. 125, Union City, Calif. 94587

Filed July 14, 1975, Ser. No. 595,861
Int. Cl.² A45C 9/00
U.S. Cl. 150—12 **11 Claims**



1. A convertible blanket adapted to be formed into a receptacle comprising

a generally flat and flexible sheet of rectangular and substantially uninterrupted material defining a bottom panel, a pair of first and second side panels and a pair of first and second end panels with said bottom panel being common to each of said side and end panels, and

closure means secured on only one side of said sheet of material in non-penetrating relationship thereto for selectively forming said panels into a receptacle.

3,976,114

SECTIONAL RUN-FLAT TIRE INSERT WITH COUPLING MEANS, PERMITTING AUTOMATIC INSTALLATION

Theodore C. Patecell, 3352 156th St., Flushing, N.Y. 11352

Filed May 22, 1975, Ser. No. 579,793
Int. Cl.² B60C 17/04
U.S. Cl. 152—158 **25 Claims**

1. A run-flat insert for inflatable tires of the tubeless type wherein beads at the inner periphery of the tire are adapted to sealably engage side flanges of a mounting rim, said insert comprising a plurality of arcuate members, each of said arcuate members having at each end coupling portions of generally circular convex and/or concave contour interfitting with coupling portions on adjacent members to align said members within a common plane while permitting relative pivotal movement within said plane, means for detachably securing together said interfitting coupling portions to thereby assemble said arcuate members as a ring member having an inner periphery firmly and circumferentially engaging said rim and an outer periphery protruding beyond the flanges of said rim, said securing means at one pair of interfitting coupling portions comprising cooperating automatic lock means, restraining circumferential separation of said coupling portions, said lock means being engagable by movement of said coupling portions toward each other in the direction perpendicular to a radius of said ring passing therethrough and disengagable by

divergent pivoting of the arcuate members at said joint, and said securing means at interfitting coupling portions remote from said one pair comprising bolt means at the pivot centers of said coupling ends and disposed perpendicularly to the plane of said arcuate members.

3,976,115

PNEUMATIC TIRE

Henri J. Mirtain, Compiegne, France, and Jonathan Mishory, Birmingham, Mich., assignors to Uniroyal, S.A., Clairox, France and Uniroyal Inc., New York, N.Y.

Filed July 18, 1974, Ser. No. 489,687
Int. Cl.² B60C 9/22, 11/06, 13/00
U.S. Cl. 152—361 R **17 Claims**

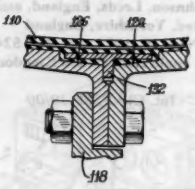
1. A pneumatic tire comprising a cord reinforced carcass, a tread overlying the crown region of said carcass, a reinforcing breaker comprising a plurality of rubberized layers interposed between said tread and the crown region of said carcass, each layer having parallel cords oriented at an angle in the range of greater than 0° to 30° relative to the median equatorial plane of the tire, the angle of the cords in each layer being opposed relative to the angle of the cords in another layer, first and second buttress regions disposed radially inward of and adjacent to the respective first and second shoulders of the tread, first and second axially directed annular protuberances formed in the corresponding first and second buttress regions, each of said protuberances having a radially external surface positioned radially inward of the surface of said tread while the tread is in engagement with the road surface in a non-flotation situation and the tire is carrying normal load and in normal operation including straight line running, cornering or breaking, and the lateral side edges of the cords in each layer of said reinforcing breaker extend into said protuberances.

3,976,116

RIM CONSTRUCTIONS

Charles E. Grawey, Peoria; Robert W. Untz, Hanna City; Keith E. Koch, Tremont, and Charles F. Gekhardt, Decatur, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Division of Ser. No. 402,268, Oct. 1, 1973, Pat. No. 3,872,504.
This application June 3, 1974, Ser. No. 476,101
Int. Cl.² B60C 9/00
U.S. Cl. 152—405 2 Claims



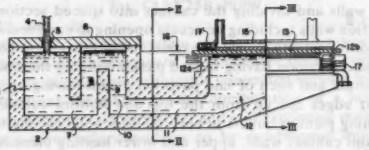
1. A rim assembly for seating and substantially centering a pneumataic tire carcass of oval cross-section comprising: first and second annular rim portions; means for securing the first and second rim portion together to form a rim for said pneumatic tire carcass; the first and second rim portions defining first and second annular groove portions which lie adjacent each other to form an annular groove with the first and second rim portions so secured together; the pneumatic tire carcass including an inwardly extending annular portion at the inner periphery thereof, and seatable in the groove; and relatively stiff, substantially inextensible means associated with the inwardly extending portion, which seat to an extent into the annular groove when the inwardly extending annular portion is so seated in the annular groove, wherein the relatively stiff, substantially inextensible means comprise an annular metal member partially embedded in the inwardly extending annular portion and having a cross-section comprising a generally narrow rectangular portion which extends across and is generally congruent with said annular portion of the tire carcass and a radial portion extending radially inwardly therefrom and in contact with the rim and secured between said first and second rim portions whereby heat generated in the tire carcass will be conducted to the rim by said relatively stiff, substantially inextensible means.

3,976,117

METHOD OF AND APPARATUS FOR CONVERTING MOLTEN METAL INTO A SEMI-FINISHED OR FINISHED PRODUCT

Erik Allan Olsson, Oerlikonerstrasse 88, Zurich, Switzerland

Filed Aug. 13, 1975, Ser. No. 604,430
Claims priority, application Switzerland, Nov. 17, 1974, 14657/74; Nov. 17, 1974, 14659/74
Int. Cl.² B22D 27/02, 11/06
U.S. Cl. 164—48 24 Claims



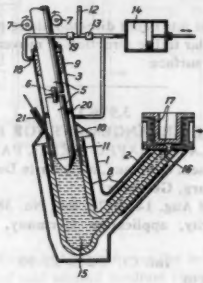
19. A method for producing a continuous flat strand directly from molten metal wherein a continuously-moving cold surface is brought into contact with the molten metal and an electromagnetic field is generated in the area of contact between the moving cold surface and the molten metal in such a manner as to induce eddy currents in the molten metal to control the area over which the molten metal will spread over and solidify on the moving cold surface.

3,976,118

METHOD FOR CASTING MATERIAL UNDER PRESSURE

Friedhelm Kahn, 2, Muhlbachstrasse, 6332 Ehringshausen, Germany

Division of Ser. No. 225,512, Feb. 11, 1972, Pat. No. 3,814,170. This application Mar. 25, 1974, Ser. No. 454,422
Claims priority, application Germany, June 8, 1971, 2128425
Int. Cl.² B22D 17/06
U.S. Cl. 164—119 2 Claims



1. A method of melting material and casting workpieces, comprising the steps of:

a. continuously introducing material to be melted into a gastight chamber of a furnace through a gas lock;
b. heating said material in said furnace for melting;
c. generating a pressure inside said furnace both by said introducing material to be melted and increasing the gas pressure in the gastight chamber of said furnace by means of a closed pressure system outside of said gastight chamber;
d. displacing said melt through a pipe connected with said furnace to the bottom of a connected mold for filling and feeding from below;
e. keeping the melt in said furnace at a nearly constant level during all casting cycles and sealing the lower part of the gastight chamber by keeping said melt in contact with a gastight refractory insert which forms the upper part of said furnace; and
f. keeping the melt in said pipe at a level near the upper end of said pipe after the gas pressure is reduced for opening or changing the mold.

3,976,119

APPARAUS FOR APPLYING A FLUID COATING TO A MOVABLE ENDLESS CASTING SURFACE

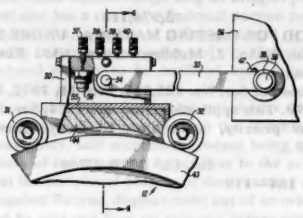
Vernon J. Miller, Carrollton, Ga., assignor to Southwire Company, Carrollton, Ga.

Filed Nov. 19, 1974, Ser. No. 525,137
Int. Cl.² B22D 11/06; B05C 9/08; F16N 7/14
U.S. Cl. 164—268 7 Claims

1. In an apparatus for the continuous casting of metal including a movable endless band wherein one surface of said band comprises a casting surface; means adjacent said surface for continuously delivering molten metal thereto and means for continuously removing cast bar therefrom, the improvement comprising;

a. a housing sealingly engaging a portion of said moving casting surface;
b. wiping means within said housing and in frictional contact with said moving casting surface for uniformly dispersing a fluid upon said moving casting surface, and

c. means within said housing for directing jets of a fluid coating onto the engaged portion of said moving casting



surface, said jets being directed along paths substantially perpendicular to the direction of movement of said moving casting surface.

3,976,120

CASTING ARRANGEMENT FOR FORMING PLATE-SHAPED METAL PARTS

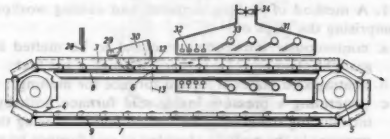
Stefan Raab, Essen, Germany, assignor to Demag Aktiengesellschaft, Duisburg, Germany

Filed Aug. 14, 1973, Ser. No. 388,248

Claims priority, application Germany, Aug. 25, 1972, 2241832

Int. Cl.² B22D *23/00*

U.S. Cl. 164—330 **4 Claims**



1. Apparatus for casting molten metal into plate-shaped parts, comprising a pair of spaced rolls having their axes arranged horizontally, an endless conveyor trained over said rolls forming an upper and a lower run each arranged approximately horizontally, said conveyor comprising a pair of laterally spaced link chains each comprising a plurality of serially arranged hinged links, an open casting mold plate supported on and extending between each pair of oppositely disposed said links in said chains and said mold plate having a recessed surface therein, each said mold plate having a transversely extending separating edge extending upwardly from the recessed surface in the upper run of said conveyor for separating successively arranged recessed surfaces formed by said mold plates, an approximately horizontal upper guide rail and a lower guide rail spaced below said upper guide rail provided for each of said chains, a hinge pin extending transversely of said conveyor between each pair of oppositely disposed links, a roller mounted on each end of said hinge pin and said rollers arranged to run on said upper and lower guide rails, the transverse ends of adjacent said mold plates being arranged in abutting engagement and the joints formed therebetween, in at least the upper run of said conveyor, being arranged in vertical planes passing through said hinge pins, said separating edge of each said mold plate being spaced from the leading and trailing ends of said mold plate and the recessed surface for the plate-shaped metal part extends between an adjacent pair of said separating edges on adjacent said mold plates with the abutting surfaces of the adjacent said mold plates located intermediate said adjacent pair of separating edges so that as each said mold plate is deflected about said roll at the end of its upper run it effects the separation of the leading end of the plate-shaped metal part while its trailing end remains supported in the following said mold plate, and means positioned at the downstream end of the upper run of said conveyor for lifting the leading ends of the plate-shaped metal parts separated from said mold plate as said mold plates move about said roll at the end of its upper run for removing the trailing end of the plate-shaped metal parts from the recessed surfaces in said mold plates and for moving the metal parts away from the downstream end of said conveyor.

3,976,121

DETECTION APPARATUS

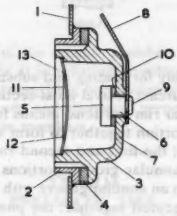
Martin Stanley Johnson, Leeds, England, assignor to Marston Radiators Limited, Yorkshire, England

Filed Nov. 18, 1974, Ser. No. 524,945

Claims priority, application United Kingdom, Nov. 30, 1973, 55658/73

Int. Cl.² F28F *19/00*

U.S. Cl. 165—11 **13 Claims**



1. A system for detecting liquid level changes in a motor vehicle cooling circuit containing an aqueous solution susceptible to formation of electrically-conducting froth, said system including a radiator having a core and a header tank, the header tank incorporating an electrical conductivity probe unit comprising a chamber containing an electrical probe electrically insulated from the body of the header tank and connected to an electrical detection circuit, the chamber being in restricted liquid communication with the interior of the header tank through a froth barrier in the form of a foraminate obturating member so that said detection circuit is unaffected by froth which may be present in said header tank.

3,976,122

COMBINATION REFRIGERATOR-THAWER APPARATUS

Graham B. Neidhardt, Oreland, Pa., assignor to McGraw-Edison Company, Elgin, Ill.

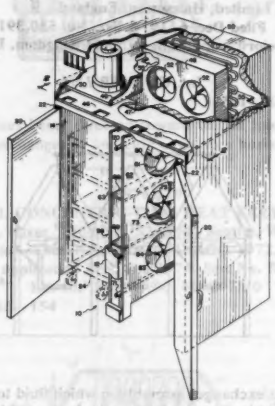
Filed Mar. 31, 1975, Ser. No. 563,577

Int. Cl.² F25B *29/00*

U.S. Cl. 165—27 **5 Claims**

1. In a combination refrigerator-thawer cabinet having opposed pairs of side walls and opposed bottom and top walls, refrigeration means for cooling air and means for ducting cabinet air over the refrigeration means and through the cabinet, a vertical partition interconnecting one pair of opposed side walls and dividing the cabinet into spaced sections, and said side walls including an access opening to each section and a door for selectively closing same, the improvement comprising said partition having spaced panels defining therebetween a plenum and each of said partition panels having upper and lower edges spaced from the top and bottom cabinet walls defining plenum outlets to both sections adjacent the top and bottom cabinet walls, upper and lower heating elements supported by the partition within the plenum, duct means through aligned openings in the partition panels defining an air passage between the sections that is isolated from the plenum and first fan means supported by the partition in the duct means, said partition also having plenum inlet openings in one panel only at locations outboardly spaced from the duct means and inboardly spaced from the heating elements and second fan

means supported by the partition in these openings, means to operate the first fan means to move cabinet air through the duct means for high velocity discharge to the section exposed to the one panel and means to operate the second fan means to draw cabinet air in said section into the plenum for redirected flow over the heating elements and high velocity discharge from the plenum outlets to both sections, control means including a manual selector for operating the cabinet as a refrigerator or as a thawer, said control means also having



first means operable with the cabinet as a refrigerator to cycle only the refrigeration means on and off respectively responsive to sensed preset high and low cabinet air temperatures, and said control means also having second means operable with the cabinet as a thawer to energize said first and second fan means and responsive to a sensed predetermined low cabinet air temperature of approximately 42°F to energize the heating elements and responsive to a sensed predetermined higher cabinet air temperature to deenergize the heating elements.

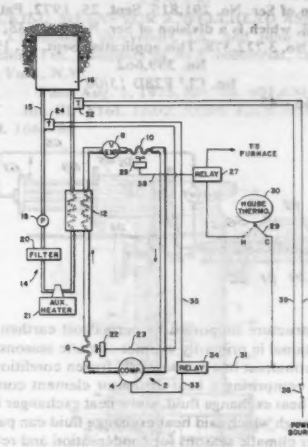
3,976,123

REFRIGERATION SYSTEM FOR CONTROLLED HEATING USING REJECTED HEAT OF AN AIR CONDITIONER

Thomas D. Davies, 11025 Stanmore Drive, Potomac Falls, Md. 20640

Filed May 27, 1975, Ser. No. 580,746
Int. Cl.² F25B *29/00*
U.S. Cl. 165—29 **8 Claims**

1. In a refrigeration system, having a refrigeration loop including compressing means, a condenser having coils, expansion means, and an evaporator connected serially for flow of refrigerant therethrough, the combination of a heat exchanger between said condenser and said expansion means for bringing a secondary medium to be conditioned into heat exchange relationship with the refrigerant, means next adjacent said condenser for removing heat from said refrigerant, a thermostat in heat sensing relation to said second medium, said means being connected to said thermostat to cycle on said means responsive to a first temperature and to cycle off said means responsive to a second temperature lower than said first temperature thereby controlling the heat content of said refrigerant flowing into said heat exchanger in a manner tending to increase the heat content when the temperature of said



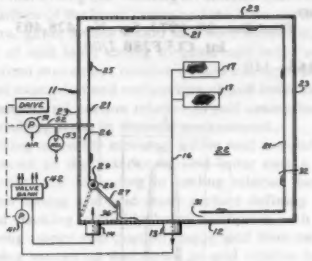
second medium drops and to decrease the heat content when the temperature of said second medium rises.

3,976,124

COOLING-CONTROLLED TANK FOR HYDRAULIC FLUID

Wilburn Kelly Brown, Morton Grove, Ill., assignor to Pettibone Corporation, Chicago, Ill.

Filed Nov. 21, 1974, Ser. No. 525,850
Int. Cl.² F25B *29/00*
U.S. Cl. 165—35 **10 Claims**



1. A tank for hydraulic fluid formed of surrounding outer walls, an inflow connection through a wall of the tank and an outflow connection through a wall of the tank; said connections being adapted for connection to conduits of a high-pressure hydraulic system; curtain means spaced a relatively narrow distance from the walls of the tank to provide a heat-dissipation passage on the outer side thereof and a main storage chamber of the inner side of the curtain means; outflow means including the outflow connection for drawing hydraulic fluid from the main storage chamber through a filter; and selection means for selecting between directing hydraulic fluid from the inflow connection to said chamber by flow through the length of the heat-dissipation passage in contact with the outer walls, or directly to the main storage chamber.

3,976,125

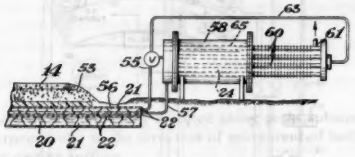
THERMAL BLEED FOR PERMAFROST ENVIRONMENTS

John S. Best, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 291,815, Sept. 25, 1972, Pat. No. 3,804,543, which is a division of Ser. No. 112,635, Feb. 4, 1971, Pat. No. 3,722,378. This application Sept. 21, 1973, Ser. No. 399,662

Int. Cl.² F28D *15/00*

U.S. Cl. 165—45 2 Claims



1. In a structure supported by permafrost earthen material and operational in primarily warmer climatic seasons to maintain the permafrost in a substantially frozen condition, a thermal bleed comprising a heat dissipator element containing a two phase heat exchange fluid, and a heat exchanger including means through which said heat exchange fluid can pass during the warmer climatic seasons for condensation and return, said heat exchanger containing a naturally regenerative heat sink material having a phase change temperature below the boiling point of said heat exchange fluid, said heat sink material being located about and in contact with said means heat exchange fluid passage to permit heat transfer therebetween, a condenser means in open communication with said thermal bleed during the below freezing climatic season, whereby said heat exchange fluid is transmitted to said condenser means, is condensed and returned to said thermal bleed during such below freezing climatic season.

3,976,126

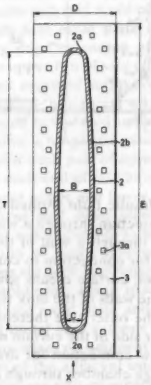
AIR COOLED SURFACE CONDENSER

Klemens Ruff, Gelsenkirchen-Buer, Germany, assignor to Gea Luftkuhlergesellschaft Happel GmbH & Co. KG, Bochum, Germany

Filed Dec. 26, 1973, Ser. No. 428,403

Int. Cl.² F28B *1/06*

U.S. Cl. 165—110 9 Claims



1. In an air-cooled surface condenser, a combination comprising a plurality of heat-exchange tubes which extend in a single row transverse to the direction of air flow, each of said tubes having an elliptical or oval interior cross-section which is unobstructed over the entire length of the tube and which is elongated in said direction of air flow, the maximum longitudinal dimension of said interior cross-section being a multiple of the maximum transverse dimension thereof and having relative to the latter a ratio of at least 6:1 and at most 12:1; a plurality of closely spaced transverse heat-exchange fins applied on the exterior of each of said tubes; and fluid-conducting conduit means communicating at least indirectly with the opposite end portions of the respective tubes.

3,976,127

HEAT EXCHANGER ASSEMBLIES

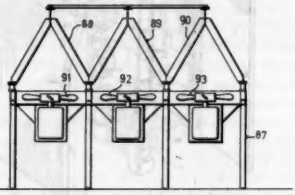
Peter John Harris, Birmingham, England, assignor to GKN Birwelco Limited, Halesowen, England

Filed Dec. 6, 1974, Ser. No. 530,391

Claims priority, application United Kingdom, Dec. 8, 1973, 57001/73

Int. Cl.² F28B *1/06*

U.S. Cl. 165—125 11 Claims



1. A heat exchanger assembly in which fluid to be cooled is passed through a plurality of finned tubes over which air flows, the tubes being grouped together into banks, each bank comprising a plurality of parallel finned tubes arranged side by side; the assembly comprising a plurality of such banks arranged side by side with each adjacent pair of banks diverging from an apex and forming an A or V frame so that the assembly has a zig-zag shape in section perpendicular to the length of the tubes and with each apex of the shape substantially filled with the finned tubes of adjacent banks so that air can flow through the apex in a direction generally parallel to a median plane of the apex parallel to the tubes and bisecting the angle between the banks meeting at said apex, the air in flowing through each said apex passing over a plurality of said tubes in succession; and a supporting framework having longitudinal support members extending parallel to the tubes and aligned with the lower apices of the assembly, the support members being provided with a plurality of upstanding columns on which the frames are supported with the lower apices of the assembly spaced above the longitudinal support members.

3,976,128

PLATE AND FIN HEAT EXCHANGER

Chhotubhai N. Patel, Richmond, and Donald W. Scofield, Connersville, both of Ind., assignors to Ford Motor Company, Dearborn, Mich.

Filed June 12, 1975, Ser. No. 586,449

Int. Cl.² F28F *9/22*; F25B *39/02*

U.S. Cl. 165—153 4 Claims

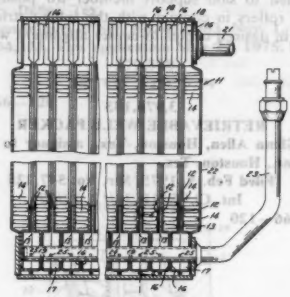
1. A plate and fin heat exchanger in the form of a refrigerant evaporator, comprising:

plate and fin means providing alternately channels for flow of refrigerant and spaces for the flow of air,

an apertured inlet manifold means in communication with the refrigerant flow channels,

and a refrigerant distribution tube inserted through the manifold means aperture into the inlet manifold means,

the tube having a series of orifices formed in the tube wall in register with the refrigerant flow channels,



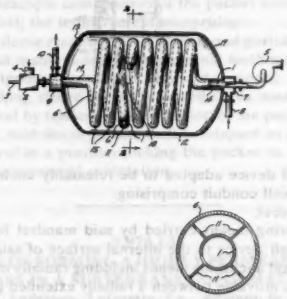
the orifices being directed toward the air inlet side of the heat exchanger at an acute angle to a horizontal plane.

3,976,129

SPIRAL CONCENTRIC-TUBE HEAT EXCHANGER

Marcus M. Silver, 1904 NE. 52nd St., Seattle, Wash. 98105

Continuation of Ser. No. 281,324, Aug. 17, 1972, abandoned.
This application Sept. 16, 1974, Ser. No. 506,534
Int. Cl.[2] F28F *9/00*; F28D *7/10*
U.S. Cl. 165—154 1 Claim



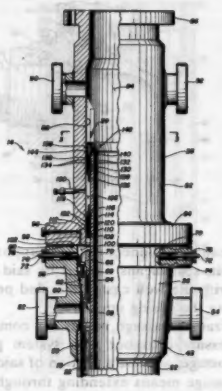
1. A heat exchanger comprising a helically coiled outer tube, only a single inner tube extending through the interior of said outer tube and helically coiled similar to said outer tube, a plurality of partition sheets spaced circumferentially of said tubes and bridging substantially radially between said single helically coiled inner tube and said helically coiled outer tube, said partition sheets, said single inner tube and said outer tube constituting and extruded integral unit, a sealed cylindrical insulating tank having opposite domed ends and subatmospheric pressure within it, housing said inner and outer tubes helically coiled about the axis of said tank for deterring transfer of heat through the exterior of said outer tube between ambient atmosphere exteriorly of said tank and the fluid in the space between said inner tube and said outer tube, and means supplying fluid to the space between said single inner tube and said outer tube and supplying fluid to the interior of said inner tube such that the difference between the temperature of ambient atmosphere and the temperature of the fluid supplied to the space between said inner tube and said outer tube is less than the difference between the temperature of ambient atmosphere and the temperature of the fluid supplied to the interior of said inner tube, for transfer of heat through the wall of said inner tube between the fluid within said inner tube and the fluid in the space between said inner tube and said outer tube.

3,976,130

PACKING MEANS FOR A WELLHEAD ASSEMBLY

Joe G. Chambless, Shreveport, La., and John W. Freeman, Houston, Tex., assignors to ACF Industries, Incorporated, New York, N.Y.

Filed Aug. 1, 1975, Ser. No. 601,694
Int. Cl.[2] F16L *15/02*, *55/00*; E21B *33/03*
U.S. Cl. 166—84 21 Claims



1. In a geothermal wellhead assembly having a casing head and an inner casing therein rigidly secured to the earth from substantially its lower end portion up to a relatively shallow depth at a point beneath said casing head and having an upper unrestrained end portion extending above said casing head, said inner casing being unsupported by said casing head and wholly supported adjacent its lower end portion, said wellhead assembly having a bore therein above the casing head receiving the inner casing and defining an annular space between the outer surface of the inner casing and the inner surface defining said bore, guide means within said bore contacting the outer surface of said inner casing to guide said inner casing upon longitudinal movement relative to said casing head upon longitudinal expansion and contraction of said inner casing upper unrestrained end portion relative to said casing head and the earth resulting from its thermal environment,

a packing assembly mounted within said annular space and secured to the exterior of said inner casing upper end portion and extending in sealing relation between said inner casing and said inner surface defining said bore,, said packing assembly being moveable with said inner casing upper end portion inside said bore as said inner casing moves up and down in said relative longitudinal movement in response to temperature changes of said inner casing.

3,976,131

PITLESS ADAPTER WITH PRESSURIZED SEAL

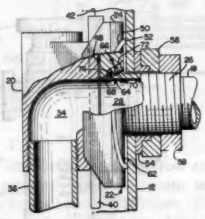
John D. Woodford, Le Claire, and Trueman W. Hiller, Bettendorf, both of Iowa, assignors to Weil-McLain Co., Inc., Dallas, Tex.

Filed Jan. 17, 1975, Ser. No. 541,767
Int. Cl.[2] E21B *33/03*; F16L *55/00*
U.S. Cl. 166—85 10 Claims

1. A pitless well adapter for use in a well of the type having a well casing formed with an aperture below ground level and a drop pipe within the casing connected to a pump, the interior of the drop pipe being at system pressure, comprising:

a hanger unit, said hanger unit including a tubular portion adapted to extend through the casing aperture to be connected to a delivery line and a body portion adapted to be disposed within the well casing to abut with the inner surface thereof about the casing aperture, said body portion defining a passage communication with said tubular portion;

a supported unit adapted to be connected to the drop pipe and having passage means for communicating the drop pipe with said passage of said body portion of said hanger unit thereby forming with said hanger unit an adapter passage;



means for sealingly connecting said supported unit to said hanger unit; seal means carried by said hanger unit for defining with the well casing a sealed pressure chamber surrounding the casing aperture;

seal pressurization passage means for communicating said sealed pressure chamber with system pressure in said adapter passage, at least a portion of said sealed pressurization passage means extending through said body portion of said hanger unit; and

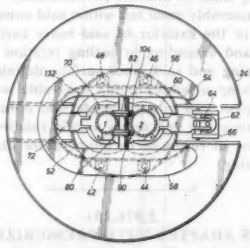
valve means disposed in said passage means for allowing an increase in system pressure to cause an increase in pressure in said sealed pressure chamber and for preventing depressurization of said sealed pressure chamber when the system pressure drops.

3,976,132

TUBING SPREADER MECHANISM

Roland George Harper, Jr., Lafayette, La., assignor to Lamb Industries, Inc., Lafayette, La.

Filed May 21, 1975, Ser. No. 579,415
Int. Cl.[2] E21B *33/06*
U.S. Cl. 166—85 **2 Claims**



1. A tubing spreader mechanism for use with a dual string spider to maintain proper alignment and center-to-center distance between vertically disposed tubing strings entering a well bore, comprising:

a support member for mounting on top of a dual string spider;

first and second guide rollers rotatable about and having respective shafts independently and adjustably movable in a horizontal direction within slots formed in said support member; and

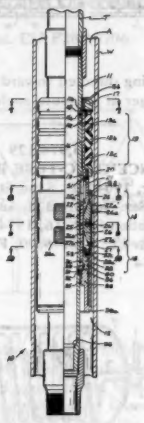
threaded adjustment rods carried in threaded supports attached to said support member for positioning said guide rollers in contact with the tubing strings placing them in desired center-to-center alignment with the spiders.

3,976,133

RETRIEVABLE WELL PACKER

Richard Glenn Allen, Houston, Tex., assignor to Brown Oil Tools, Inc., Houston, Tex.

Filed Feb. 5, 1975, Ser. No. 547,225
Int. Cl.[2] E21B *33/12, 23/00*
U.S. Cl. 166—120 **10 Claims**



1. A well device adapted to be releasably anchored internally of a well conduit comprising:

a. a mandrel;

b. anchoring means carried by said mandrel for securing said well device to the internal surface of said well conduit, said anchoring means including radially movable slip means, movable between a radially extended position for effecting anchoring engagement with said internal surface and a radially retracted position for permitting said well device to be moved longitudinally through said well conduit;

c. friction creating means on the radially outer surface of said slip means for securely gripping the internal surface of said well conduit;

d. setting means included in said well device and associated with said anchoring means for moving said slip means from said radially retracted position to said radially extended position;

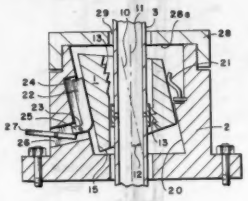
e. first slip moving means included in said setting means, said first slip moving means being carried about a central mounting means and including a split annular body having a tapered, radially outer bearing surface in operative engagement with said slip means whereby longitudinal movement of said first slip moving means along said central mounting means moves said slip means radially; and

f. friction creating locking means carried on the radially inner surfaces of said first slip moving means for preventing longitudinal movement of said slip moving means in only one direction relative to said central mounting means whereby said first slip means may be locked in said extended position.

3,976,134
MANDREL LOCKING SLEEVE

Robert Frank Berry, Dallas, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

Continuation-in-part of Ser. No. 411,983, Nov. 1, 1973, Pat. No. 3,904,233. This application May 22, 1975, Ser. No. 579,990
Int. Cl.² A21C 3/04
U.S. Cl. 166—120 6 Claims



1. In an oil well packer of the type having a mandrel, resilient packer elements, and mechanical gripping means on said mandrel for engagement with the well casing, and being actuable by telescopic compression of the packer components on said mandrel; the improvement comprising:

locking sleeve means located slidably and partially rotatably on said mandrel and having internal teeth means therein for gripping engagement with said mandrel;

said locking sleeve means arranged to be rotated on said mandrel by telescopic compression of the packer components, said sleeve means further adapted to engage said mandrel in a position locking the packer in a telescopically compressed orientation.

3,976,135
METHOD OF FORMING A HIGHLY PERMEABLE SOLID MASS IN A SUBTERRANEAN FORMATION

Buddy W. Anderson, Lafayette, La., assignor to Halliburton Company, Duncan, Okla.

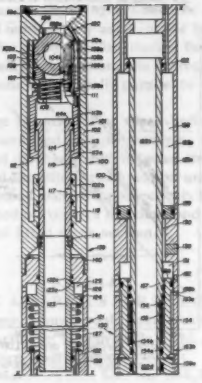
Continuation-in-part of Ser. No. 294,429, Oct. 2, 1972, abandoned. This application Oct. 15, 1974, Ser. No. 514,709
Int. Cl.² E21B 43/02
U.S. Cl. 166—276 18 Claims

8. A method of forming a hard, highly permeable mass in a subterranean formation through a well penetrating said formation, comprising mixing in a carrier liquid a quantity of particulate solid material with a quantity of resin composition, the particulated solid material being comprised of a mixture of inert solids which are coated by said resin composition and soluble solid particulate material which are not coated by said resin composition, wherein the soluble material is solid particles comprised of a homogeneous mixture of a hydrocarbon wax and a polymer, said solid particles being insoluble at ambient temperatures, but oil soluble upon reaching the subterranean formation temperatures; depositing a sufficient quantity of the resin composition particulated solid material mixture in said subterranean formation to form a permeable mass in said subterranean formation capable of allowing fluids to pass therethrough; causing said resin composition in said mass to harden forming a consolidated permeable mass; and dissolving the soluble solid particulate material, thereby forming a highly permeable consolidated mass in the subterranean formation.

3,976,136
PRESSURE OPERATED ISOLATION VALVE FOR USE IN A WELL TESTING APPARATUS AND ITS METHOD OF OPERATION

David L. Farley, and Robert T. Evans, both of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.

Filed June 20, 1975, Ser. No. 588,991
Int. Cl.² E21B 33/10, 47/00
U.S. Cl. 166—264 15 Claims



1. In a valve for use in an oil well testing string located in an oil well bore and having a packer arranged for selectively sealing the well bore isolating that portion of the oil well bore above the packer from that portion of the oil well bore below the packer, said valve having:

fluid containing means incorporated in the testing string for supplying operating force to testing apparatus located in the testing string; and,

valve means incorporated in the testing string and having a normally open position and a closed position for controlling fluid communication between said fluid containing means and the oil well bore exterior of said testing string;

the improvement comprising pressure responsive operating means, operably connected to said valve means, for moving said valve means from the normally open position to the closed position responsive to a specified pressure increase in that portion of the well bore above the packer over the pressure in that portion of the well bore below the packer.

15. A method of operating a valve in an oil well tool located in an oil well comprising the steps of:

selectively closing the well bore with a packer, thereby isolating the pressure in that portion of the well bore below the packer from that portion of the well bore above the packer;

increasing the pressure in that portion of the well bore above the packer for creating a pressure differential between that portion of the well bore above the packer and that portion of the well bore below the packer;

selectively moving a valve from a normally open position to a closed position responsive to said pressure differential;

selectively opening the packer, thereby establishing communication between that portion of the well bore above the packer and that portion of the well bore below the packer for removing said pressure differential; and

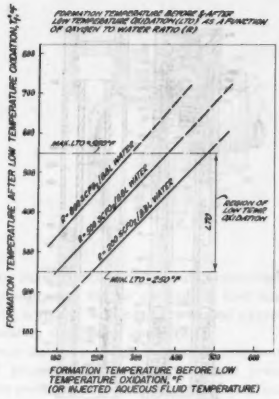
moving said closed valve to the normally open position responsive to the removal of said pressure differential.

3,976,137

RECOVERY OF OIL BY A COMBINATION OF LOW TEMPERATURE OXIDATION AND HOT WATER OR STEAM INJECTION

Issam S. Bousaid, Houston, Tex., assignor to Texaco Inc., New York, N.Y.

Filed June 21, 1974, Ser. No. 481,579
Int. Cl.[2] E21B 43/24
U.S. Cl. 166—272 20 Claims


FORMATION TEMPERATURE AFTER LOW TEMPERATURE OXIDATION, °F
FORMATION TEMPERATURE BEFORE LOW TEMPERATURE OXIDATION, °F
(OR INJECTED AQUEOUS FLUID TEMPERATURE)
REGION OF LOW TEMP. OXIDATION
MIN. LTO = 250°F

1. A method for the recovery of hydrocarbons from a subterranean hydrocarbon-bearing formation traversed by at least one injection well and at least one production well connected by flow channels, comprising the steps of;

a. injecting into a portion of said formation via said injection well a mixture of an oxygen-containing gas and a heated aqueous fluid to effect a low temperature oxidation in a temperature range of from about 250° to about 550°F of said hydrocarbons adjacent said injection well, wherein the ratio of the oxygen in said oxygen-containing gas to the water in said aqueous fluid is in the range of about 200 to about 800 SCF of oxygen per barrel of water,

b. continuing injection of said mixture to maintain said low temperature oxidation to heat said hydrocarbons in the neighborhood of said flow channels,

c. displacing said hydrocarbons via said flow channels toward said production well,

d. producing said hydrocarbons from said production well.

3,976,138

METHOD OF INCREASING PERMEABILITY IN SUBSURFACE EARTH FORMATION

Patrick Joseph Colpoys, Jr., Houston, Tex., and Eugene Allen Neel, Jr., Lawrenceburg, Tenn., assignors to Union Carbide Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 493,908, Aug. 1, 1974, abandoned. This application Oct. 15, 1975, Ser. No. 622,615
Int. Cl.[2] E21B 43/26
U.S. Cl. 166—280 1 Claim

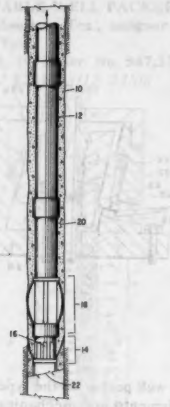
1. In a method of improving the permeability to fluids of a sub-surface earth formation penetrated by a well wherein a fluid is pumped into the well to create a fracture therein, the improvement which comprises introducing an alumina propping agent having a size of at least 30 mesh into a fluid; introducing said alumina propping agent containing fluid into a fracture, the compaction pressure of which is at least 8,000 psi, to deposit a packed multilayer distribution of alumina propping agents.

3,976,139

ANCHORING FOR TENSIONING CASING IN THERMAL WELLS

Lawrence B. Wilder, Tulsa, Okla., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Filed Dec. 30, 1974, Ser. No. 537,168
Int. Cl.[2] E21B 43/25, 33/00
U.S. Cl. 166—285 5 Claims



1. A method of extra-tensioning a string of casing to be cemented in a borehole drilled in the earth and wherein fluids will flow through said casing at a temperature greater than the initial temperature of said casing which comprises:

circulating cement down the interior of said casing and up the annulus between the outer wall of the casing and the bore-hole wall;

rotating and reciprocating the casing in the borehole wall, at least after a substantial portion of said annulus has been filled with cement;

after such reciprocation and rotation and cement placement, anchoring the lower end of said string of casing to said borehole wall; and

thereafter, but before said cement has set, applying a tension to said string of casing and maintaining said tension until said cement has set.

3,976,140

METHOD OF CONSOLIDATING SUBTERRANEAN FORMATIONS USING DILUTED RESINS

Christopher M. Shaughnessy, and William M. Salathiel, both of Houston, Tex., assignors to Exxon Production Research Company, Houston, Tex.

Filed June 23, 1975, Ser. No. 589,163
Int. Cl.[2] E21B 33/138
U.S. Cl. 166—295 20 Claims

1. A method for the consolidation of an incompetent subterranean formation surrounding a well which comprises:

a. injecting into said formation a liquid resin containing sufficient amounts of a diluent to reduce the resin viscosity to 30 centipoises or less at about 72°F, said diluent including substantial amounts of resin-miscible component and substantial amounts of a resin-immiscible component, said resin-miscible component and said resin-immiscible component being mutually miscible; and

b. thereafter injecting a nonaromatic hydrocarbon liquid into said formation to extract diluent from the liquid resin, said liquid being substantially immiscible with said liquid resin, miscible with said resin-immiscible component, and at least partially miscible with said resin-miscible component.

3,976,141

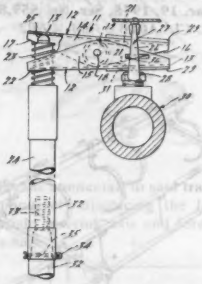
SPRINKLER HEAD SHUT-OFF MECHANISM

Charles L. Harrington, Southfield, Mich., assignor to Wigma Corporation, Royal Oak, Mich.

Filed June 24, 1975, Ser. No. 589,938

Int. Cl.² A62C 37/20

U.S. Cl. 169—90 7 Claims



1. In a shut-off unit for an open sprinkler head to stop the flow of water therefrom after its closure element has been opened, a pair of like channel shaped elements having a flat web and right angle sides with the sides of one element telescoped within the sides of the other element, a pin joining the sides together at substantially the center, a coiled spring through which the pin extends having arms in engagement with the inner surface of the webs at the forward insertable end of the unit, a nut associated with one of the webs at the rearward end of said unit, a shaft having a thread insertable in said nut and in engagement with the opposite web for forcing the spring-urged end of the webs toward each other so as to be able to enter a ring about the opening of the sprinkler head, and a strip of elastomeric material on the outer surface at the ends of the webs which are spring pressed away from each other, one of said strips engages the inner surface of the ring, the other of which engages the wall of the opening through which the water was flowing to provide a seal therefor.

3,976,142

BALLAST TREATING APPARATUS

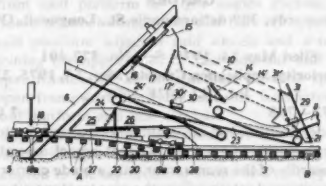
Franz Plasser; Josef Theurer, both of Vienna, and Karl Folser, Linz-Urfahr, all of Austria, assignors to Franz Plasser Bahnbaumaschinen-Industrie Gesellschaft m.b.H., Vienna, Austria

Filed Dec. 10, 1970, Ser. No. 96,773

Claims priority, application Austria, Dec. 18, 1969, 111774/69

Int. Cl.² E01B 27/00

U.S. Cl. 171—16 16 Claims



1. An apparatus for treating ballast and adapted to move on a track including rails fixed to ties resting on a ballast bed and defining cribs therebetween, comprising

1. a frame moving on the track rails;

2. means mounted on the frame for lifting a section of the track;

3. a ballast removing chain means mounted on the frame and extending transversely underneath the track section for removing ballast from the ballast bed under the lifted track section;

4. a ballast cleaning screen mounted on the frame and separating the removed ballast into cleaned ballast and rubble;

5. conveyor means for conveying the removed ballast from the ballast removing chain means to the ballast cleaning screen, for removing the rubble, and for conveying the cleaned ballast from the ballast cleaning screen to underneath the lifted track section in a conveying path, the conveyor means comprising a conveyor band having a discharge end immediately adjacent the ballast removing chain means for uniformly distributing the ballast underneath the lifted track section, the conveyor band being pivotal in a plane substantially parallel to the plane of the track; and

6. ballast storage means storing clean ballast, the storage means being arranged in said conveying path under the conveyor band discharge end between the ballast cleaning screen and the lifted track section and receiving the conveyed, cleaned ballast for selectively storing and depositing selected portions of the clean and cleaned ballast underneath the lifted track section.

3,976,143

WINDROWING APPARATUS FOR PEANUT DIGGER

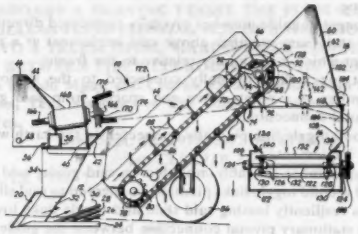
Alexander J. Rodger, Louwskraal, South Africa, assignor to Slattery Manufacturing (Proprietary) Ltd., Potgietersrus, Transvaal Province, South Africa

Filed Mar. 7, 1975, Ser. No. 556,360

Claims priority, application South Africa, Mar. 18, 1974, 74/1745

Int. Cl.² A01D 29/00

U.S. Cl. 171—101 1 Claim



1. A peanut digging apparatus including a frame; hitch means mounted on the frame for attaching the peanut digging apparatus to a tractor; at least one share mounted on the frame for lifting a peanut crop from the soil; a soil separating conveyor mounted on the frame to the rear of said one share for receiving peanut crop material from said one share, for conveying peanut crop material up and to the rear, and for separating soil from the peanut crop material; a side delivery conveyor removably connected to the frame by mounting means for receiving peanut crop material from the soil separating conveyor, for conveying the peanut crop material toward one side of the machine and for discharging the crop material to the ground; said mounting means including guide members and cooperating guide surfaces on the lower rear portion of the frame and the upper portion of the side delivery conveyor which laterally and longitudinally position the side delivery conveyor and permit vertical movement of the side delivery conveyor relative to the frame, and lifting means for moving the side delivery conveyor vertically up into engagement with the bottom portion of the frame and holding means

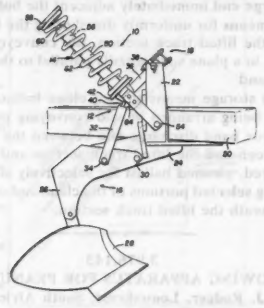
holding the side delivery conveyor in position adjacent the bottom portion of the frame; and drive means for driving the separating conveyor and the side delivery conveyor.

3,976,144

SPRING AUTOMATIC RESET PLOW ASSEMBLY WITH RESET DAMPER SYSTEM

Harold A. Ralston, Bettendorf, Iowa, and Phillip G. Venable, Orion, Ill., assignors to J. I. Case Company, Racine, Wis.

Division of Ser. No. 450,720, March 13, 1974, Pat. No. 3,949,814. This application June 30, 1975, Ser. No. 591,668
Int. Cl.² A01B *61/04, 15/14, 35/24*
U.S. Cl. 172—267 **1 Claim**



1. In an automatic reset assembly for an earth working implement, comprising:

an elongated, generally horizontal frame for an earth working implement, and including a member which is stationary relative to the frame;

an earth working implement pivotally connected to said frame;

an elongated guide member pivotally connected directly to the stationary member above said implement at a pivot point which is stationary relative to the frame;

a first toggle link pivotally connected to the stationary member at a point above and spaced from said guide pivotal connection;

a second toggle link pivotally connected to the earth working implement;

a slide member slideably mounted on said guide, said first and second toggle links pivotally connected to said slide;

means resiliently biasing said slide and toggle links toward the stationary pivotal connection between the guide and stationary member;

an abutment between the slide member and the stationary pivotal connection, said abutment limiting the movement of said slide and links toward said stationary pivotal connection and preventing the toggle links from reaching a dead center position;

the earth working implement being resiliently biased downwardly through the force exerted on said second toggle link by said biasing means, said biasing means (1) allowing the implement to pivot upwardly when it strikes an immovable object and (2) automaticaally downwardly pivoting said implement once the object has been passed to properly reset the implement for further operation; and

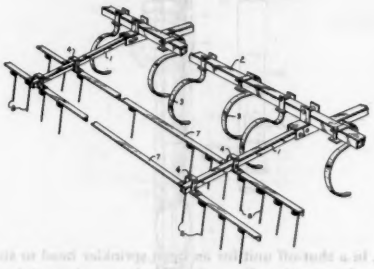
a reset damper system characterized by said first link being pivotally connected to said stationary member about a pivot pin which is stationary relative to the frame, said first link including a slot through which said pin extends, and said slot having a major dimension along the axis of the first link greater than the diameter of the pin to allow limited movement of the first link along its axis, and means (1) resiliently biasing the first link axially away from its connection with the slide member, (2) permitting the first link to move along its axis relative to the stationary pivot pin when the earth working implement is reset and (3) returning the first link to its normal operative position after the resetting operation.

3,976,145

FINISH TOOLS WITH MOUNTING BRACKET THEREFOR

Calvin B. Blair, P.O. Box 76, Barnard, Kans. 67418

Filed Mar. 19, 1975, Ser. No. 559,897
Int. Cl.² A01B *23/04, 49/02*
U.S. Cl. 172—615 **4 Claims**



1. In combination:

a. at least two draw carrier arms adapted for mounting on an implement frame and extending longitudinally of the direction of motion thereof;

b. at least two bars each being spaced apart along the longitudinal extent of said arms and having a plurality of laterally spaced harrow tines supported thereon and depending therefrom, said bars extending transversely of said carrier arms, and

c. respective bracket means mounting each one of said bars to each of said arms and forming with said arms the only connection between said bars, each of said bracket means comprising a retainer having a first upstanding side wall positioned adjacent one of said arms,

d. each of said bracket means further comprising means on said side wall securing same to one of said bars, and means associated with said side wall rockingly mounting same to one of said arms and fixing said one of said bars longitudinally to said one of said arms so as to prevent movement of said one of said bars along the longitudinal exent of said one of said arms,

e. said rocking mounting means being positioned a first distance from said one of said bars, each one of said bars thus being mounted by said bracket means to each of said arms so as to be free to move independently of the other of said bars through a first angle with respect to said arms.

3,976,146

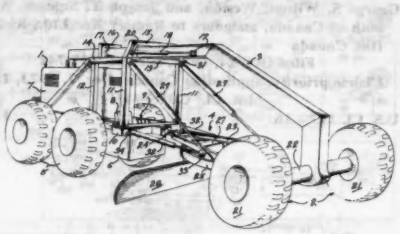
GRADER

Bernard Desourdy, 309 deNormandie St., Longueuil, Quebec, Canada

Filed May 14, 1975, Ser. No. 577,401
Claims priority, application Canada, Mar. 13, 1975, 222012
Int. Cl.² E02F *3/76*
U.S. Cl. 172—788 **7 Claims**

1. A grader comprising, in combination, a rear tractor unit having a cab mounted thereon, a front wheel assembly arranged forwardly of the rear tractor unit, a blade carrier frame assembly positioned intermediate the rear tractor unit and the front wheel assembly, a boom extending lengthwise fore and aft in overhead elevated position over said cab and said blade carrier frame assembly and having a front end connected to the front wheel assembly and bodily displaceable therewith, a support mounted on said rear tractor unit, defining an upright

steering axis and a fore and aft sliding passage for the boom, and both pivotally and slidably carrying the rear end of the boom in engagement in the fore and aft sliding passage, and



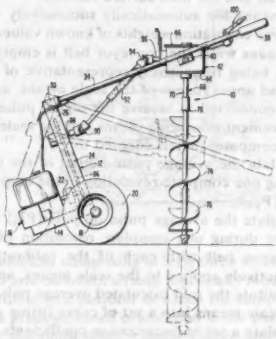
an actuation means connected to said tractor unit and to said boom and operatively displacing the latter both pivotally about said upright steering axis and fore and aft endwise in said sliding passage.

3,976,147

AUGER

Kelly G. Cunningham, P.O. Box 8155, 600 Goff Mtn. Road, Nitro, W. Va. 25143

Filed Jan. 23, 1975, Ser. No. 543,493
Int. Cl.² E04H 17/26
U.S. Cl. 173—22 **1 Claim**



1. A safety earth auger comprising:

a mobile frame comprising an engine platform, an axle mounted to said platform along one edge, round engaging wheels on said axle and on opposite sides of said platform, a back frame fixed to said platform parallel to and in general alignment with said axle and extending upwardly from said platform at right angles thereto, said back frame member comprising side bars on opposite sides of said platform adjacent said wheels and a top crossbar joining the upper ends of said side bar and forming an open framework, an intermediate crossbar spanning said open framework between said side bars intermediate of said platform and said top bar,

an engine mounted on said platform;

a pair of straight elongated handle members each fixedly secured to the top crossbar at one end on respective sides and projecting generally parallel to each other in a direction opposite to said engine;

an enclosed drive housing including a base, a top and an annular side wall, pivot members projecting from said side wall at diametrically opposite locations and mounted to said handles intermediate the ends of said handles and said back frame member for pivoting said housing between said handles about an axis at right angles to said handles;

a shaft pivotably mounted within said enclosed drive housing, extending through said base, with an upper end portion within said housing and a lower end portion external of said housing and carrying an auger blade thereon, said shaft upper end portion carrying a pair of oppositely facing spaced coaxial gears,

a rotatable gland carried by said drive housing side wall on the side facing said open back frame member, said gland eccentrically carrying a shaft including a drive gear internally of said drive housing annular wall for selective engagement with said oppositely facing double gears,

said engine having a drive shaft extending towards said auger and terminating within said open back frame member,

a gear wheel fixed to said engine drive shaft and positioned between said back frame side bars,

an upper gear wheel rotatably mounted to said intermediate crossbar between said side bars,

an endless drive chain engaging said gear wheels, and

a shaft having universal joints on respective ends coupled through said universal joints respectively to said upper gear wheel and said drive carried by said gland, external of said drive housing and gear shift means carried by said gland and extending upwardly between said handle members;

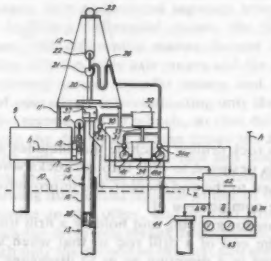
whereby, said safety earth auger may be manually propelled and steered from behind said auger, said gears may be shifted, and said auger may be directed into the ground without change of position of the operator, and wherein the said drive chain is shielded by said open frame work and said universal shaft connection is shielded by said pair of handle bars to maximize protection of said operator during use of said auger.

3,976,148

METHOD AND APPARATUS FOR DETERMINING ONBOARD A HEAVING VESSEL THE FLOW RATE OF DRILLING FLUID FLOWING OUT OF A WELLHOLE AND INTO A TELESCOPING MARINE RISER CONNECTING BETWEEN THE WELLHOUSE AND THE VESSEL

Leo Donald Maus, and Charles Emory Barton, both of Houston, Tex., assignors to The Offshore Company, Houston, Tex.

Filed Sept. 12, 1975, Ser. No. 612,916
Int. Cl.² E21B 7/12
U.S. Cl. 175—7 **11 Claims**



10. In a system for drilling a subaqueous wellhole from a floating vessel which system includes a marine riser or the like providing a return flow path for drilling fluid flowing upwardly from the wellhole toward the vessel and which marine riser includes a telescoping joint, the system further including a drill string depending from the vessel and extending downwardly through the marine riser into the wellhole, a mud system associated with the vessel for pumping drilling fluid into the drill string and downwardly into the wellhole, and a

conduit connecting between the marine riser and the mud system for providing fluid communication between the marine riser and the mud system, the method of determining the true flow rate of the drilling fluid flowing out of the wellhole and into the marine riser including the steps of:

measuring the rate of flow of the drilling fluid flowiing through a portion of the conduit which is continually full of drilling fluid and generating a first signal proportional thereto;

measuring the rate of change in the volume of the drilling fluid stored in the marine riser above the point at which the conduit intersects with such riser and generating a second signal proportional thereto;

measuring the extension and contraction of the telescoping joint in the marine riser and generating a third signal proportional thereto; and

compensating the first signal with the second and third signals to produce a fourth signal proportional to the true flow rate of the drilling fluid flowing out of the wellhole into the marine riser.

3,976,149

ROCK DRILL EQUIPMENT HAVING A MECHANIZED DRILL BIT EXCHANGE

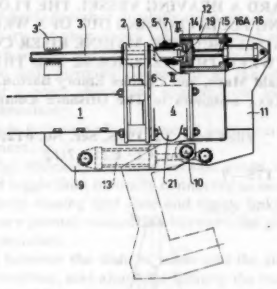
Sven Granholm, and Borje Meijer, both of Skelleftea, Sweden, assignors to Linden-Alimak AB, Skelleftea, Sweden

Continuation of Ser. No. 330,530, Feb. 8, 1973, abandoned. This application Jan. 30, 1975, Ser. No. 545,450

Claims priority, application Sweden, Feb. 8, 1972, 1454/72

Int. Cl.² E21C *19/04*

U.S. Cl. 175—52 **12 Claims**



12. In a rock drilling machine that includes at least one drill rod that is designed to drill through rocks when it has a drill bit attached to the end thereof, the improvement which comprises the combination of

a. means for gripping and holding a drill bit that is located on the end of a drill rod so that when said drill rod is rotated in a direction so as to disengage a drill rod and drill bit the drill bit will not rotate,

b. means to rotate said drill rod so as to disengage it from its drill bit,

c. means to remove the disengaged drill bit from the area of disengagement and to bring to said area of disengagement a new drill bit,

d. means to bring the new drill bit into end-to-end alignment with the drill rod so that when the drill rod is rotated in the engaging direction the new drill bit will be fixed on the end of the drill rod.

3,976,150

ENDLESS CONVEYOR BELT LOAD MEASUREMENT SYSTEM AND METHOD OF AUTOMATICALLY CALIBRATING SAME

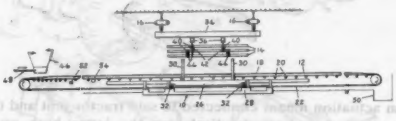
George S. Wilson, Weston, and Joseph T. Sniezek, Aurora, both of Canada, assignors to Ramsey Rec Ltd., Richmond Hill, Canada

Filed Oct. 24, 1974, Ser. No. 517,741

Claims priority, application Canada, Dec. 7, 1973, 187645

Int. Cl.² G01G *11/14*

U.S. Cl. 177—16 **1 Claim**



1. Apparatus for automatically calibrating an endless conveyor belt load measurement system comprising the combination of:

a. movement measuring means having a digital pulse output (P_r) for measuring the movement of the conveyor belt,

b. means to determine one complete revolution of the conveyor belt,

c. scale means having a digital pulse output (P_w) adapted to measure the weight of successive portions of the conveyor belt and the load carried thereby,

d. hoist means for automatically successively applying at least three calibration weights of known values (T_i) to the scale means while the conveyor belt is empty, the three weights being respectively representative of lower, medium and upper ranges of the scale means, and

e. means connected to receive the digital pulse outputs of the movement measuring means and the scale means, the digital computer means adapted to:

i. calculate the average pulse output of the scale means during one complete revolution of the empty conveyor belt (P_{we}),

ii. calculate the average pulse outputs (P_{wi}) of the scale means during one complete revolution of the empty conveyor belt with each of the calibration weights respectively applied to the scale means, and

iii. substitute the said calculated average pulse outputs of the scale means into a set of curve fitting equations to calculate a set of linearization coefficients and then to substitute the said calculated linearization coefficients into formula to calculate the load carried by the conveyor belt.

3,976,151

SELF-PROPELLED GOLF CART

Anthony Farque, Fayetteville, Ark., assignor to Citation Manufacturing Company, Inc., Siloam Springs, Ark.

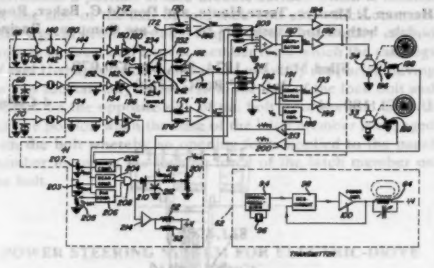
Division of Ser. No. 166,051, July 26, 1971, Pat. No. 3,812,929. This application Apr. 17, 1974, Ser. No. 461,809

Int. Cl.² B62D *11/02*

U.S. Cl. 180—6.5 **20 Claims**

1. In combination with an energy field, a control system comprising a plurality of antenna devices located within said energy field, separate receiver means respectively connected to said antenna devices for developing signal voltages at levels depending on the positions of the antenna devices within the energy field, means connected to at least two of the receiver means for producing direction control signals in response to differences in energy levels between the signal voltages, means connected to at least one of the receiver means for producing speed control signals reflecting the positions of the antenna devices within the energy field, a pair of servo operating de-

vices, and pulse developing means connected to said servo operated devices for converting the direction control and



speed control signals into drive pulses of one polarity supplied to the servo operating devices.

3,976,152

WHEELCHAIR HAVING PIVOTABLE RAMP FOR CLIMBING CURBS

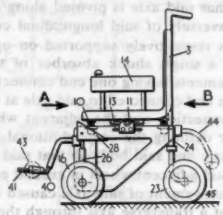
Albert Bell, 49 Norris Hill Drive, Heaton Norris, Stockport, SK4 2NR, England

Filed Nov. 15, 1974, Ser. No. 524,182

Claims priority, application United Kingdom, Dec. 5, 1973, 56365/73

Int. Cl.² B62D *17/00;* **B62B** *9/02*

U.S. Cl. 180—9 **14 Claims**



1. A wheelchair comprising at least three wheels and at least one pivotal arm on which a ramp is pivotally mounted, the arm being pivotable to a position in which the ramp it supports is placed in a predetermined orientation in the path of a respective wheel, the ramp being triangle shaped and supported by the arm so that when it is so placed and the wheelchair is advanced the respective wheel runs up it, and the ramp being weighted so as to assume a substantially uniform orientation whatever the position of the arm relative to its pivot.

3,976,153

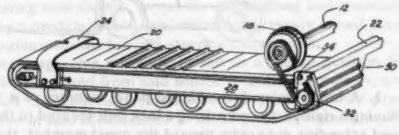
VEHICLE WITH REMOVABLE TRACTION APPARATUS

Michel J. Lateur, 2621 Toledo Ave., Santa Clara, Calif. 95051

Filed Apr. 25, 1975, Ser. No. 571,467

Int. Cl.² B62D *55/04*

U.S. Cl. 180—9.2 C **4 Claims**



1. In combination: a vehicle having a drive shaft and means for rotating the drive shaft; a traction apparatus having a pair of spaced, endless, flexible tracks, a pair of spaced, elongated side members for each track, respectively, and a number of bogie wheel units for mounting each track, respectively, on the corresponding side members for movement relative thereto; a first crossbar and a second crossbar for each track, respectively, the crossbars being spaced apart and coupled with respective side members adjacent to corresponding ends thereof for releasably mounting the ends on the vehicle; means releasably coupling the second crossbar to the vehicle; means coupled with the first crossbar for releasably locking the same in a fixed position relative to the vehicle when the second crossbar is coupled thereto, said locking means including a bracket having a slot and a projection spaced from the slot, said first crossbar having a pair of opposed side margins, one of the side margins being receivable in the slot and the other side margin being adjacent to said projection when the first crossbar is locked in said position; and means coupled to the tracks for connecting the same in driving relationship to said drive shaft, whereby the tracks will be driven in response to the rotation of the drive shaft.

3,976,154

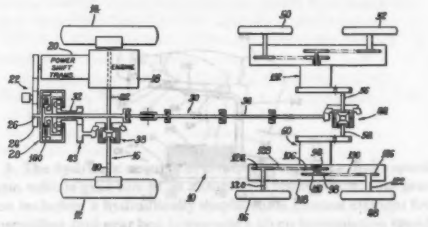
DRIVE LINE DIFFERENTIAL APPARATUS FOR A VEHICLE

Ralph B. Clark, Morton, and Howard R. Anderson, Dunlap, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Jan. 13, 1975, Ser. No. 540,751

Int. Cl.² B60K *17/36, 17/16*

U.S. Cl. 180—24.05 **6 Claims**



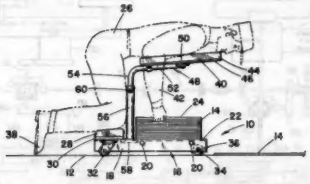
1. In a vehicle including first wheel means adjacent one end thereof, and second wheel means adjacent the other end thereof, said first wheel means comprising four wheels, a first pair of said four wheels disposed on one side of the vehicle generally in tandem, a second pair of said four wheels disposed on the other side of the vehicle generally in tandem, drive axle means, first and second separate torque transfer means each including differential means, the first torque transfer means and differential means thereof operatively interconnecting only the drive axle means and the first pair of wheels, the second torque transfer means and differential means thereof operatively interconnecting only the drive axle means and the second pair of wheels, so that driving power applied through the drive axle means drives the first pair of wheels through only the first of the first and second torque transfer means, the differential means of the first torque transfer means allowing differential rotation of one of the first pair of wheels relative to the other, and so that driving power applied through the drive axle means drives the second pair of wheels through only the second of the first and second torque transfer means, the differential means of the second torque transfer means allowing differential rotation of one of the second pair of wheels relative to the other, wherein the drive axle means comprise a first drive axle and a second drive axle, the first torque transfer means being in operative connection with the first drive axle and the first pair of wheels, the second torque transfer means being in operative connection with the second drive axle and the second pair of wheels, further comprising drive shaft means, and third torque transfer means including differential means, interconnecting the drive shaft

means and first and second drive axles, so that driving power may be applied from the drive shaft means through the third torque transfer means to drive the first and second drive axles, meanwhile with the differential means of the third torque transfer means allowing differential rotation of one drive axle relative to the other drive axle, wherein the second wheel means comprise first and second wheels, one disposed on either side of the vehicle, and further comprising fourth torque transfer means including differential means operatively interconnecting the drive shaft means and first and second wheels of the second wheel means, so that driving power may be applied from the drive shaft means through the fourth torque transfer means to the first and second wheels of the second wheel means, meanwhile with the differential means of the first torque transfer means allowing differential rotation of one of the first and second wheels of the second wheel means relative to the other.

3,976,155
TILE LAYING CART

Abner S. Esch, Box 500, R.D. No. 1, Bird-in-Hand, Pa. 17505

Filed June 27, 1975, Ser. No. 591,150
Int. Cl.² B25H *5/00*
U.S. Cl. 280—32.5 **8 Claims**

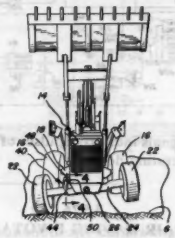


1. A tile laying cart comprising in combination, a pair of elongated members, means extending between and fixed to said members to fix the same in spaced parallel relationship to form a base frame, pairs of caster-type supporting rollers mounted upon said frame adjacent the opposite ends thereof respectively comprising forward and rearward ends in use and said supporting rollers being mounted in transversely spaced relationship to each other to prevent tilting of said frame in use, similar vertical members fixed at one end to said elongated members intermediately of the ends thereof but closer to the rearward ends than the forward ends, a normally horizontal chest-supporting pad member having a narrower projection at the forward end thereof when in use positioned to support the chin of the occupant of the cart, a supporting frame member having a horizontal portion attached to the lower surface of said chest supporting pad member and also having a pair of projections depending from the rearward end of said supporting frame and engaging said vertical members for support thereby and vertically adjustable therewith to dispose said chest-supporting pad member above and parallel to the forward end portion of said frame at desired elevations, and a knee-supporting pad member extending across and fixed to the rearward end portions of said elongated members, the upper surfaces of the forward portions of said elongated members comprising tile supporting means adapted to receive a stack thereof between said members and said chest-supporting pad member and said supporting frame therefor.

3,976,156
SHOCK ABSORBER ARRANGEMENT FOR MATERIAL HANDLING VEHICLE

Herman J. Maurer, Terre Haute, and Donald C. Baker, Rosedale, both of Ind., assignors to J. I. Case Company, Racine, Wis.

Filed May 15, 1974, Ser. No. 470,070
Int. Cl.² B60G *13/00*
U.S. Cl. 180—41 **4 Claims**

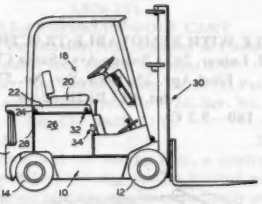


1. A vehicle including a body having a forward end and a rear end; a pair of driving wheels on opposite sides of a longitudinal center of said body adjacent said rear end; a material handling unit suspended on said rear end; a front axle extending transversely of said body adjacent said forward end; a pivotal connection between said body and said axle, said pivotal connection having its axis aligned with said longitudinal center so that said axle is pivoted along a vertical plane extending transversely of said longitudinal center; a pair of steering wheels respectively supported on opposite ends of said axle; and a single shock absorber of the type having biased-apart elements having one end connected to said body and an opposite end connected to said axle at a point between said pivotal connection and the adjacent wheel, said single shock absorber defining the only additional interconnection between said axle and said body so that said shock absorber will maintain said adjacent wheel in ground engaging contact during pivotal movement of said axle caused by oscillation of said body about a transverse axis through the centers of said driving wheels.

3,976,157
SELF-LOCKING LATCH FOR VEHICLE PANEL MEMBERS

Edgar Wahnemuehl, Mulheim (Ruhr), Germany, assignor to Clark Equipment Company, Buchanan, Mich.

Filed Feb. 18, 1975, Ser. No. 550,391
Int. Cl.³ B62D *25/10*; **E05C** *3/14*
U.S. Cl. 180—69 R **15 Claims**



1. A latch device for a hinged panel member of a vehicle having a rigid body comprising a lock bolt secured to the body and extending outwardly toward the panel member, the outer end portioh including an inwardly tapered arcuate surface, a generally U-shaped latch member supported pivotally from the panel member, the legs of which latch member extend

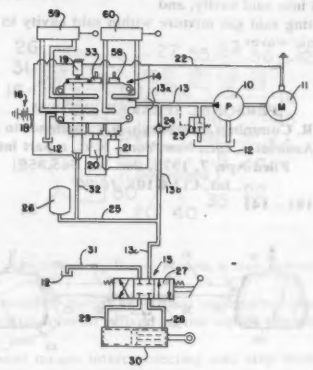
normally over the lock bolt in a diagonal direction, the base of which latch member is adapted to engage during latching movement a portion of said arcuate surface which is located on one side of the axis of said lock bolt and which connects said legs at least partially longitudinally outwardly of said arcuate surface, and a pivot member from which the said legs of said U-shaped latch member are pivotally supported having an axis substantially transverse to the axis of the lock bolt and located on the opposite side of the bolt from the said arcuate surface portion when the base of the latch member is engaged with the bolt whereby an opening force applied to the panel member increases the locking force of the latch member on the bolt.

3,976,158

POWER STEERING SYSTEM FOR ELECTRIC-DRIVE LIFT TRUCK

Walter M. Shaffer, Peoria County, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Apr. 25, 1975, Ser. No. 571,830
Int. Cl.² B62D 5/06
U.S. Cl. 180—132 7 Claims



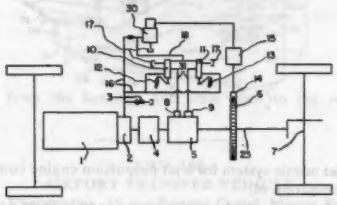
1. A hydraulic steering system for an electrically powered vehicle comprising in combination:
- a reservoir;
- a hydraulic pump for drawing fluid from said reservoir;
- means for driving said pump including an electric motor and a source of electric power including a circuit for said electric motor;
- steering motor means;
- implement motor means;
- steering circuit means including accumulator means for selectively directing hydraulic fluid for powering said steering motor means;
- implement circuit means including open centered control valve means operative in a neutral position for directing fluid from said pump to said reservoir and movable to other positions for selectively directing hydraulic fluid for powering said implement motor means;
- pressure responsive control means for activating and deactivating said electric motor for establishing and maintaining a predetermined minimum fluid pressure in said accumulator means for said steering circuit; and,
- a charging valve normally biased to a closed position for diverting fluid from said source to said accumulator, and said charging valve responsive to a predetermined pressure in said accumulator to move to an open position for communicating said fluid to exhaust, wherein said pressure responsive control means includes an electrical switch for controlling communication of electric power to said motor, and said switch being disposed adjacent said charging valve for actuation thereby when said charging valve is shifted.

3,976,159

AUTOMATIC SEQUENTIAL CONTROL DEVICE

Bernard René Mennesson, Paris, France, assignor to Societe a Responsabilite Limitee dite SERAM, Livry-Gargan, France

Filed May 29, 1974, Ser. No. 474,464
Claims priority, application France, May 29, 1973, 73.19544
Int. Cl.² F16H 5/24, 5/60
U.S. Cl. 180—105 R 5 Claims



1. The hydraulic sequential control device for a multi-speed ratio vehicle gear box of an automotive type vehicle, said gear box including a hydraulically displaceable control element for controlling said gear box to provide a given transmission speed ratio, said device comprising:
- means for supplying a variable current as a base signal function of the speed of the vehicle,
- means for processing and amplifying said variable current,
- at least one servolimiter comprising a solenoid operated variable position valve, said valve including a solenoid and a magnetically displaceable valve needle controlled thereby,
- means for supplying said amplified, variable current to said servolimiter such that said servolimiter supplies a variable hydraulic control pressure,
- means responsive to at least one supplementary operating parameter of said vehicle other than said base signal, directly mechanically acting on said valve needle to vary the control pressure in addition to said base signal acting thereon to vary the control pressure supplied by the servolimiter at least by a ratio of one to two between the minimum value and the maximum value of said supplementary parameter,
- hydraulic distributor means controlled by said control pressure, resulting both from the actuation of said base signal and the operation of said supplementary parameter for delivering a general service pressure to said gear box to actuate said control element, and
- wherein said means responsive to said at least one supplementary operating parameter acting on said valve needle comprises elastic means operatively acting on said valve needle in opposition to the electromagnetic force exerted on the valve needle by said solenoid, and means for varying the output force of said elastic means as a function of the value of said supplementary parameter.

3,976,160

DEVICE FOR THE ATTENUATION OF NOISE EMISSION BY THE JET PIPES OF JET ENGINES

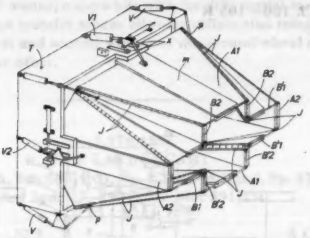
Rene Gerard Hoch, La Rochette, and Michel Henri Julliand, Melun, both of France, assignors to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation, Paris, France

Filed Aug. 30, 1974, Ser. No. 502,200

Claims priority, application France, Aug. 31, 1973, 73.31580

Int. Cl.² B64D *33/06*

U.S. Cl. 181—33 HD **4 Claims**



1. A jet nozzle system for a jet propulsion engine comprising the combination of:

i. a nozzle wall aerodynamically designed to form a tapering primary central passage for emitting a central major gaseous jet portion about a nozzle axis,

ii. a first pair of opposite generally planar side panels (B1,B1) adjustable for inclination towards each other at a minor and at a major taper angles and positioned in a laterally offset location with respect to said nozzle axis, to form an over-tapering secondary lateral passage for emitting a lateral minor gaseous jet portion displaced sidewise from said nozzle axis, whereby said lateral minor gaseous jet portion is pinched compared with said central major gaseous jet portion,

iii. a second pair of opposite generally planar side panels (B2,B2) arranged at substantially 90° with respect to said first pair of panels, said second pair of panels being adjustable for inclination towards each other at a minor and at a major taper angles and positioned in a laterally offset location with respect to said nozzle axis, to form an over-tapering secondary lateral passage for emitting a lateral minor gaseous jet portion displaced sidewise from said nozzle axis, whereby said lateral minor gaseous jet portion is pinched compared with said central major gaseous jet portion, and

iv. panel control means for selectively adjusting said first and second pairs of panels simultaneously either to said minor taper angle of the first pair and major taper angle of the second pair or to said major taper angle of the first pair and minor taper angle of the second pair.

3,976,161

POWER AUGER SEISMIC SOURCE

Wilson H. Carman, Jr., Houston, Tex., assignor to Amoco Production Company, Tulsa, Okla.

Continuation of Ser. No. 61,293, Aug. 5, 1970, abandoned. This application Dec. 4, 1972, Ser. No. 312,170

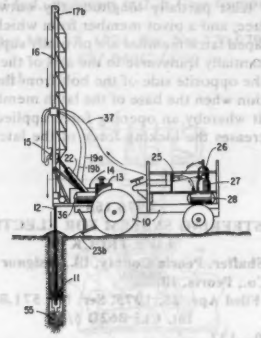
Int. Cl.² G01V *1/04*

U.S. Cl. 181—116 **12 Claims**

1. A method of generating seismic waves which comprises the steps of

rotating and driving an earth auger down to a desired depth in the earth so as to loosen said earth and form a hole therein but leave a substantial part of said loosened augered earth remaining in said hole about the auger shaft,

raising said auger and shaft a fraction of said depth to compress and seal said augered earth in said hole and about said shaft and to form a cavity in the earth therebelow,



introducing a detonatable gas mixture through said auger shaft into said cavity, and

detonating said gas mixture within said cavity to generate seismic waves.

3,976,162

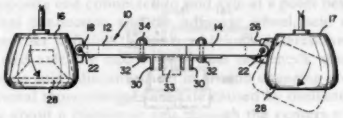
PERSONAL SPEAKER SYSTEM

Kenneth R. Cummings, Newburgh, N.Y., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Apr. 7, 1975, Ser. No. 565,855

Int. Cl.² G10K *10/00*

U.S. Cl. 181—141 **1 Claim**



1. A speaker system comprising: an elongated arm being selectively variable in length, bracket means carried by said arm configured for locking engagement with the generally vertical headrest support post means of an associated automobile; said bracket means being configured for securing said arm to said post means with opposite ends of said arm extending from said post means; and first and second speakers respectively pivotly carried by said opposite ends of said arm.

3,976,163

STORAGE-STAND

David E. Watkinson, 1809 E. River Drive, Margate, Fla. 33063

Filed Dec. 29, 1975, Ser. No. 644,433

Int. Cl.² A45F *3/00*; A47B *41/04*; E04G *1/28*

U.S. Cl. 182—20 **8 Claims**

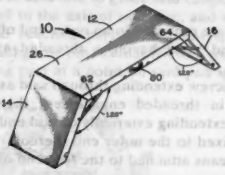
1. In a storage-stand comprising a deck having opposite ends and first and second legs pivotally affixed respectively to said opposite ends of said deck, said deck and said legs each including a planar member and side members affixed thereto forming a transverse rim around the perimeter of said planar member, the improvement wherein:

opposed side members of said deck and each of said legs are located opposite each other at said opposite ends;

said opposed side members each form an acute angle with the corresponding planar member to which they are affixed; and

said legs each having a folded position lying inwardly of said ends and parallel to said deck and an extended position

at an obtuse angle to said deck wherein said opposed side members abut each other respectively to provide a rigid



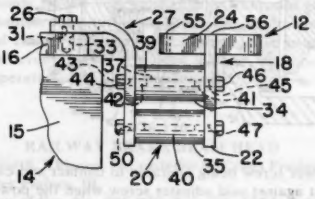
stand wherein said legs spread obtusely outward from said deck.

3,976,164

STEP ASSEMBLY FOR AN EARTH-MOVING VEHICLE

Calvin L. Miller, Aurora, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed May 19, 1975, Ser. No. 578,577
Int. Cl.² B60R *3/00*
U.S. Cl. 182—89 **8 Claims**



1. In a vehicle having frame means, a step assembly comprising:

a step member having a vertical attachment plate and a horizontal footrest affixed to the top of the attachment plate; and

attachment means interconnecting said step member and said frame means for mounting said step member horizontally separated from said vehicle, said attachment means allowing said step member to deflect generally longitudinally of the frame means upon application of a given force thereto longitudinally of the frame means while allowing lesser deflection in a downward direction relative to the frame means upon application of said given force thereto in a downward direction relative to the frame means.

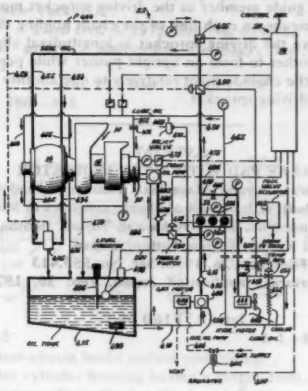
3,976,165

LUBRICATING AND OIL SEAL SYSTEM FOR A HIGH SPEED COMPRESSOR

Karol Pilarczyk, Loudonville, N.Y., assignor to Norwalk-Turbo, Inc., Latham, N.Y.

Division of Ser. No. 466,877, May 3, 1974. This application Apr. 25, 1975, Ser. No. 571,611
Int. Cl.² F04B *39/02*
U.S. Cl. 184—6.16 **9 Claims**

1. An integrated oil system for providing lubricating and sealing oil to the bearings and oil seals of a gas compressor comprising a reservoir means containing thhe system oil, pump means for pumping the system oil at a pressure higher than the pressure of the gas in the compressor, seal oil feed means for conducting this higher pressure oil to the oil seals of the compressor, oil pressure reducing means for taking a portion of the higher pressure oil and reducing its pressure to a pressure lower than the pressure of the gas in the compressor suitable for lubricating bearings, lubrication oil feed means for conducting this lower pressure oil to the bearings of the compressor for lubrication thereof, and drain means for draining



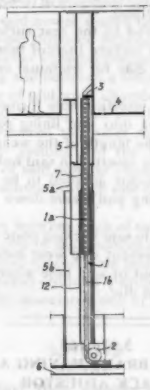
the oil from the bearings and seals back to the reservoir means.

3,976,166

AIRPORT TRANSFER VEHICLE

Jean G. Charpentier, 19 rue Eugene Cretel, Massy, France

Filed Jan. 14, 1975, Ser. No. 540,962
Claims priority, application France, Jan. 17, 1974, 74.01619
Int. Cl.² B66B *11/04*
U.S. Cl. 187—19 **7 Claims**



1. An elevating device comprising a plurality of chain links pivotally connected together to form a chain having two sections arranged end-to-end, an upright first guide member supporting one of said chain sections for upward and downward movement, said one chain section engaging at a position above said first guide member a member to be elevated, a second upright guide member supporting the other of said chain sections for upward and downward movement relatively thereto, means for guiding said first guide member for telescopic sliding relatively to said second guide member, a driving sprocket mounted beneath said second guide member and engaging the chain whereby said chain is movable upwardly and downwardly of said second guide member, a pivot pin

connecting said two chain sections together and bearing against the lower end of said first guide member to effect raising and lowering of said first guide member relatively to said second guide member as the driving sprocket moves the chain, and means on each link of the chain holding the links thereof above the driving sprocket in longitudinal alignment one with another to form an upright pusher while permitting the links of the chain to pivot relatively to one another to pass around the driving sprocket.

3,976,167

BRAKE PAD WITH WEAR INDICATOR

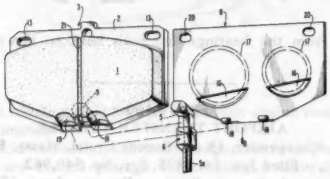
Akiyoshi Hirai, Toyota; Masachika Yamamoto, and Ryoichi Kimura, both of Itami, all of Japan, assignors to Sumitomo Electric Indusries, Ltd., Osaka and Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, both of, Japan

Filed Feb. 26, 1975, Ser. No. 553,413

Claims priority, application Japan, Feb. 26, 1974, 49-23703[U]

Int. Cl.² F16D *66/02*

U.S. Cl. 188—1 A **5 Claims**



1. A brake pad and brake wear indicator assembly for use in a disc brake which includes a rotatable disc and means for pressing the assembly against the disc so that the brake pad frictionally engages the disc, said assembly comprising:

a friction brake lining pad,

a backing plate secured to the rear surface of said lining pad, with the front surface thereof being disposed adjacent said rotatable disc for frictional engagement therewith,

a peripherally-closed insertion hole formed in said backing plate and extending into said lining pad for a distance corresponding to the length of the wear indicator.

a brake wear indicator inserted in said hole and comprising an electrical conductor adapted to be engaged by said disc when said lining pad wears down to a desired safe thickness, and

a shim plate clamped to said backing plate and covering said insertion hole to prevent said wear indicator from being forced backward out of said hole when said assembly is pressed against said disc.

3,976,168

MECHANICAL DISC BRAKE HAVING AN AUTOMATIC SLACK ADJUSTOR

Mayjue A. Yamamoto, San Bernardino, Calif., assignor to Daniel G. Durfee, San Bernardino, Calif.

Filed Sept. 2, 1975, Ser. No. 609,223

Int. Cl.² F16D *65/56*

U.S. Cl. 188—71.9 **7 Claims**

1. A mechanical disc brake for a heavy-duty automotive vehicle comprising, in combination:

a rotatable disc having friction faces on opposite sides thereof;

a pair of friction pads disposed with one pad adjacent each of said friction faces;

a caliper housing operably connected to each of said friction pads for urging the same into braking engagement with their respective friction faces when the brake is actuated, said caliper housing having a cylinder bore aligned with one of said friction pads;

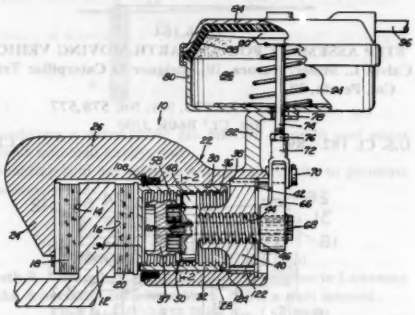
a piston slidably disposed within said cylinder bore and having an end portion abutting against said one friction pad;

an end plate mounted in an outer end of said cylinder bore, said end plate having a threaded axial bore provided therein;

a power screw extending through said axial bore in said end plate, in threaded engagement therewith; said power screw extending externally of said end plate and having a lever fixed to the outer end thereof;

power means attached to the free end of said lever to operate the same

an adjuster screw having threaded connection with said piston;



said power screw being operable to contact and exert axial thrust against said adjuster screw when the power screw is advanced by its screw-thread connection to said end plate responsive to angular movement of said lever;

spring means connected to said power screw and to said adjuster screw, and exerting a predetermined torque on the adjuster screw tending to advance the latter toward the power screw whenever there is no axial clearance between them;

means frictionally engaging said piston for retracting the same a predetermined small distance from its respective friction pad when the brake is released, so as to open up a minimum running clearance between the friction pads and said friction faces on the disc.

3,976,169

DISC BRAKE

Yutaka Ogawa, Tokyo, Japan, assignor to Akebono Brake Industry Co., Ltd., Japan

Continuation of Ser. No. 397,599, Sept. 14, 1973, abandoned. This application Feb. 6, 1975, Ser. No. 547,503

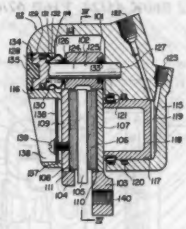
Claims priority, application Japan, June 25, 1973, 48-71460; Sept. 19, 1972, 47-108661

Int. Cl.² F16D *65/02*

U.S. Cl. 188—73.3 **3 Claims**

1. A disc brake, for small vehicles, comprising, in combination, a rotatable brake disc; a fixed support secured to a rigid part of the vehicle structure and constituted by two leg portions, positioned on respective opposite sides of said disc, and a head portion straddling said disc and interconnecting said two leg portions; each leg portion having a friction pad guiding part; respective friction pads mounted in said guiding parts and positioned on opposite sides of said disc; a caliper assembly constituted by two caliper leg portions positioned on respective opposite sides of said disc and constituting, respectively, an acting member and a reacting member, and a caliper head portion interconnecting said caliper leg portions; a single guide pin extending through an aperture formed in the head

portion of said fixed support parallel to the axis of said disc, and extending through said caliper head portion to mount said caliper assembly on said fixed support at a point above the outer circumference of said disc to guide said caliper assembly in a direction parallel to the axis of said disc; and mechanism fixedly securing said reacting part, at a point spaced very substantially from said guide pin, to that friction pad disposed adjacent said reacting part at a point on said pad spaced very



substantially from said guide pin; said mechanism positively preventing any swinging of said caliper about said guide pin relative to said fixed support by virtue of the relatively very long torque arm resulting from the location of said mechanism at such points spaced very substantially from said guide pin; said mechanism constituting the sole means restraining swinging of said caliper about said guide pin relative to said fixed support; whereby backlash of said caliper, responsive to a braking operation, is positively prevented.

3,976,170

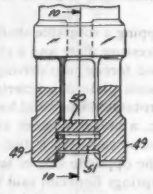
RAILWAY BRAKE BEAM HEAD

Irvin J. Spaeth, Chicago, Ill., assignor to Evans Products Company, Des Plaines, Ill.

Division of Ser. No. 526,000, Nov. 21, 1974, Pat. No. 3,912,053, which is a continuation-in-part of Ser. No. 386,764, Aug. 8, 1973, abandoned. This application June 13, 1975, Ser. No. 586,666

Int. Cl.² F16D 65/06

U.S. Cl. 188—236 **3 Claims**



1. A railway brake beam head with a pair of transversely spaced toes at at least one end, said toes having faces adapted for selective mounting engagement with the rear face of either a low friction type brake shoe having a rear lug receivable between said toes or a high friction type brake shoe having a similar lug spaced lengthwise of the shoe from the location of the low friction brake shoe lug, and a pair of reinforcing crossbars extending between said toes at said one end and cast integrally therewith, said crossbars being spaced apart lengthwise of said toes at said one end for interference respectively with the lugs on the different types of shoes, either of said crossbars being selectively removable from said toes prior to application of a brake shoe to leave the other of said crossbars in place and thereby accommodate the mounting of a selected one of said types of brake shoes on the head and prevent the subsequent mounting of the other type of brake shoe on the head by interference of said other crossbar with the rear lug of the other type of brake shoe.

3,976,171

DUAL-CIRCUIT BRAKE SYSTEM

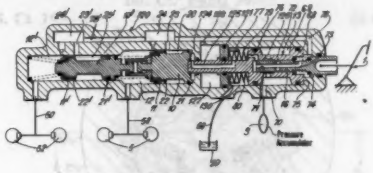
Juan Belart, Walldorf, Germany, assignor to ITT Industries, Inc., New York, N.Y.

Filed Oct. 3, 1975, Ser. No. 619,413

Claims priority, application Germany, Nov. 8, 1974, 2452952

Int. Cl.² B60T 11/20, 13/58

U.S. Cl. 188—345 **11 Claims**



1. A dual-circuit brake system comprising:

a master cylinder housing having a longitudinal axis;

two master-cylinder pistons disposed in tandem relationship in said housing coaxial of said axis;

a work chamber for each of said two master-cylinder pistons disposed in said housing, said work chambers being disposed at the end of its associated one of said master-cylinder pistons remote from a brake pedal;

a pair of brake circuits, each of said brake circuits being connected to a different one of said work chambers;

a power source capable of producting a pressurized fluid;

a pressure-control valve disposed in said housing coaxial of said axis between one of said master-cylinder pistons and said brake pedal connected to said power source, said pressure-control valve introducing said pressurized fluid from said power source into said brake circuits, said pressure-control valve being capable of being displaced by said brake pedal to manually actuate said master-cylinder pistons if said power source fails;

an annular chamber disposed between the outer surface of each of said master-cylinder pistons and the inner surface of said housing and between a sleeve seal disposed in the associated one of said work chambers engaging the inner surface of said housing and another seal close to said brake pedal between the outer surface of each of said master-cylinder pistons and the inner surface of said housing, each of said annular chambers being connected to said power source through said pressure-control valve; and

a fluid connection between each of said work chambers and the associated one of said annular chambers provided by longitudinal bores spaced from said axis in the associated one of said master-cylinder pistons and past the outer periphery of the associated one of said sleeve seals.

3,976,172

BRAKE

Erwin F'Geppert, Novi, Mich., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

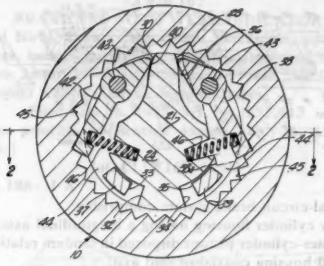
Filed Nov. 22, 1974, Ser. No. 526,194

Int. Cl.² B60T 7/12

U.S. Cl. 192—8 R **2 Claims**

1. In a rotary power transmitting system: a stationary reaction annulus having internal teeth therearound; a rotatable drive member concentric with said annulus; a rotatable driven member axially aligned with the drive member; a pawl swingably mounted on the driven member for movement toward and away from the reaction teeth; a driver surface located on the drive member to rotate around the drive member axis, an abutment located on said driven member in the path of the drive member surface so that power transmission takes place

only when the driver surface is forcibly engaged with the abutment; a cam surface located on the drive member remote from the driver surface, and a cooperating follower surface located on the pawl, whereby initial rotary movement of the drive member causes the cam surface to exert pressure on the follower surface for thus swinging the pawl out of engagement with the associated reaction teeth; said abutment being oriented to the pawl and driver surface so that the driver surface forcibly engages the abutment only after the pawl has been disengaged from the reaction teeth; and spring means yieldably trained between the drive member and pawl so that the pawl is biased toward a condition engaged with the reaction teeth and cam surface, whereby when the drive member is put in a non-powered condition the spring means moves the pawl into engagement with the teeth and also moves the drive member so that the driver surface is spaced from the abutment; the swing axis of the pawl located so that the tooth-engaging surface of the pawl moves generally parallel to the load surfaces of the reaction teeth during movement of the pawl toward and away from the teeth.



3,976,173

TRANSMISSION DEVICES WITH NO-BACK BRAKES

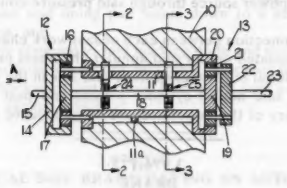
Byron Arthur Thomas Spencer, Westwood, N.J., assignor to Lucas Industries Limited, Birmingham, England

Filed Jan. 28, 1975, Ser. No. 544,786

Claims priority, application United Kingdom, Feb. 13, 1974, 6519/74

Int. Cl.² B60T 7/12

U.S. Cl. 192—8 R **12 Claims**



1. A transmission device, comprising a relatively fixed body, a movable input member, two transmission members movable independently of each other by said input member, an output member responsive to movement of either of said transmission members, means for limiting movement, in either direction, of one of said transmission members relative to said body, and a pair of brake arrangements operable by movement of said one transmission member relative to said body to arrest movement of the other transmission member, one of said brake arrangements being operable by movement of said one transmission member in a first direction to prevent movement of said other transmission member in one direction, and the other of said brake arrangements being operable by movement of said one transmission member in a second direction to prevent movement of the other transmission member in a direction opposite to said one direction.

3,976,174

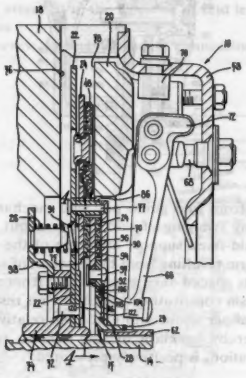
CLUTCH DISC WITH COAXIAL BRAKE

Jean Claude Van Dest, Ris-Orangis, France, assignor to Massey-Ferguson Inc., Detroit, Mich.

Filed Apr. 23, 1975, Ser. No. 570,899

Int. Cl.² B60K 41/24; F16D 67/02

U.S. Cl. 192—13 R **14 Claims**



1. A brake for stopping a rotatable member driven by a clutch said clutch having a flywheel, a pressure plate and a clutch disc, said clutch disc being on said rotatable member and forced into driving relation with said flywheel by said pressure plate characterized by brake means on said clutch disc to rotate therewith, a stationary member engagable by said brake means, said brake means actuated by said pressure plate to disengage said brake means from said stationary member and to rotate with said clutch disc on engagement of said clutch and on disengagement of said clutch said brake means engaging said stationary member to stop said rotatable member.

13. A brake for stopping a rotatable shaft driven by a clutch having a flywheel, a pressure plate and a clutch disc affixed to said rotatable shaft and forced into driving relation with said flywheel by said pressure plate characterized by a stationary member around said rotatable shaft and having a flange parallel to said clutch disc, a brake member axially slideable and circumferentially fixed on said clutch disc, a flange like member on said shaft on the opposite side of said clutch disc from said brake member, springs between said flange-like member and said brake member to urge said brake member against said flange, on engagement of said clutch said pressure plate actuating said brake member to compress said springs and disengage said brake member from said flange and on disengagement of said clutch said springs forcing said brake member against said flange to be in braking relation with said rotatable shaft.

3,976,175

SELF-ENERGIZING CLUTCH

William B. Herbert, 111 Yantacaw Brook Road, Upper Montclair, N.J. 07043

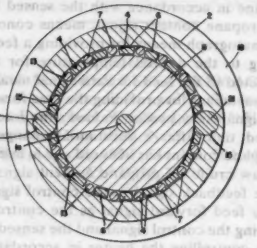
Filed Mar. 3, 1975, Ser. No. 554,907

Int. Cl.² F16D 41/08

U.S. Cl. 192—44 **8 Claims**

1. In a clutch of the character described, a driving cup having a recess in one end thereof bounded at its periphery by a multiplicity of flat surfaces, each of which is disposed angularly to the surfaces immediately adjacent thereto, a cage

disposed adjacent said cup and having a face adjacent said recess provided with a multiplicity of circumferentially-spaced projections or bars extending into said recess and each having its radially-outermost face disposed closely adjacent one of



said flat surfaces, a rotor disposed within said recess and having an annular outer surface disposed radially-inwardly of said projections or bars, and rollers disposed between the periphery of said recess and said annular outer surface, said rollers being interposed between said projections or bars.

3,976,176

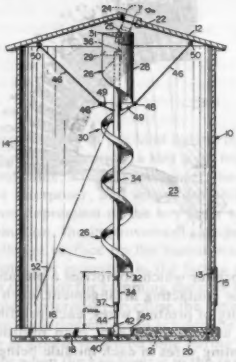
SPIRAL CHUTE DEVICE

John C. Kurtz; Thomas E. Kurtz, and George D. Kurtz, all of R.R. 1,, New Haven, Ind. 46774

Filed May 22, 1975, Ser. No. 579,873

Int. Cl.² B65G *11/06*

U.S. Cl. 193—12 **8 Claims**



1. A spiral chute device for use in supplying seed material and the like without damage to a storage chamber having top and bottom wall means and side wall means; said chute device comprising a hopper disposed near the top wall means for receiving material to be stored in the chamber and having a bottom opening, and an upwardly opening spiral chute leading from said bottom opening in the hopper downwardly to above and near the bottom wall means of the chamber, said chute preventing the material from undergoing more than a predetermined amount of free fall from said spiral chute when supplied to the chamber, support means for swingably connecting said hopper to the top wall means of the chamber, a center post to which said chute is connected, and the lower end of said post being formed for adjustably engaging guide means on the bottom wall means of the chamber whereby disengagement of said center post from the guide means will permit swinging of said post and the chute connected thereto laterally in the chamber.

3,976,177

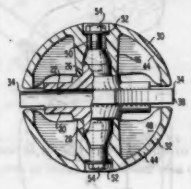
TWO-LOBED CONVEYOR BALLS

Elwood B. Brown, Cedarburg, Wis., assignor to Rexnord Inc., Milwaukee, Wis.

Filed Feb. 25, 1975, Ser. No. 552,816

Int. Cl.² B65G *39/02*

U.S. Cl. 193—37 **26 Claims**



1. A two-lobed conveyor ball comprising:

a. a hub having a hole therethrough which defines a first axis and which is adapted to receive a first axle;

b. second and third axles coaxially mounted on said hub at right angles to the first axis and on opposite sides thereof;

c. first and second generally hemispherical lobes rotatably mounted on said second and third axles respectively, said first and second generally hemispherical lobes each comprising:

i. a generally hemispherical wall having a thickness much less than the radius thereof;

ii. a centrally and radially mounted bearing depending from the inner surface of said generally hemispherical wall, said bearing being shaped to receive the associated one of said second and third axles; and

iii. a plurality of reinforcing webs extending radially from the outer surface of said bearing to the inner surface of said generally hemispherical wall; and

d. a spacer disc mounted on said hub, extending between said first and second generally hemispherical lobes, and filling the gap therebetween at the outer surface thereof, thereby preventing objects or material being passed over the conveyor ball during use thereof from getting caught between said first and second generally hemispherical lobes.

3,976,178

COIN RELEASE OPERATED LOCKING DEVICE

Evaristo Koch, Lehnhaldenstrasse 20, 9014 St. Gall, and Kilian Schwizer, Flawilstrasse 17, 9202 Gossau, both of Switzerland

Filed Nov. 18, 1974, Ser. No. 524,679

Claims priority, application Switzerland, Nov. 19, 1973, 16237/73

Int. Cl.² G07F *5/00*

U.S. Cl. 194—67 **14 Claims**

1. A coin-operated locking device having

a lock unit (**9, 10**) including a locking bolt (**11**) and a lock rotor (**13**) operating the bolt (**11**), which can be moved by a key (**30**) between locked and unlocked position

a coin chute (**3, 5**) and a coin-retaining means (**17, 27**) arranged to retain an inserted coin (**18**) in a first position;

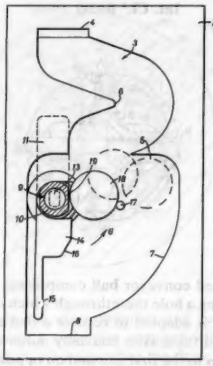
and a lever (**14**) associated with the bolt (**11**) and arranged to release a retained coin (**18**) only after movement of the bolt (**11**) from locking position to an opening position thereof:

wherein a release element (**19, 20**) is provided, comprising a first pin (**19**) movable by an inserted coin (**18**) and arranged to release rotation of the lock rotor (**13**), pro-

jecting into the coin-receiving chute or channel (3) of the device, movable to release position by means of an inserted coin to release the bolt (11) and permit movement of the bolt into locking position, the release element cooperating with the movable, lock rotor (13);

a second pin (23) located inside the rotor (13) is provided;

the first pin (19) contacting against the second pin (23) inside the rotor which, upon being engaged by the first



pin (19), is depressed inside the rotor (13) and permits rotation of the rotor, and hence of the bolt when a coin bears against the first pin;

and the lever (14) is formed with a deflection surface (16) facing a coin in retained position for deflection of the coin from the retained position, upon movement of the bolt (11) and hence the lever (14) after release of the release element (19, 20) to a second position, preparatory to release of the coin.

3,976,179

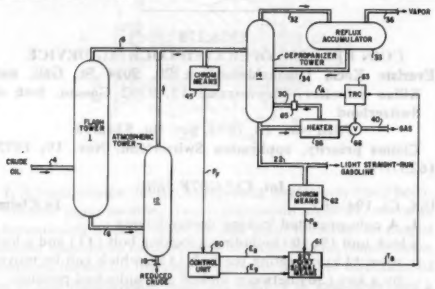
CONTROLLING THE TEMPERATURE OF A DEPROPANIZER TOWER BY CHROMATOGRAPHIC ANALYSIS OF FEED AND BOTTOMS

Charles W. Harrison, Nederland, and Glenn A. Senters, Beaumont, both of Tex., assignors to Texaco Inc., New York, N.Y.

Filed Dec. 30, 1974, Ser. No. 537,163

Int. Cl.² B01D *3/42, 3/00;* **C10G** *7/00*

U.S. Cl. 196—132 **8 Claims**



1. A control system for a refining unit including a flash tower receiving raw crude oil and providing a light component vapor to a depropanizer tower and flash crude oil to an atmospheric tower with the depropanizer tower providing light straight run gasoline, a portion of which is heated to a desired temperature by a heater and recirculated back to the depropanizer tower, comprising first chromatograph means for sensing the propane content of the light component vapor and providing a signal P_F corresponding thereto, second chromatograph means for sensing the propane content of the gasoline and providing a corresponding signal P_B, means for sensing the temperature of the gasoline being fed back to the second tower and providing a signal T_A corresponding thereto, means connected to the first chromatograph means providing a feed forward signal corresponding to a desired temperature for the gasoline in accordance with the sensed light component vapor propane content signal, means connected to the second chromatograph means for providing a feedback signal corresponding to the desired temperature for the gasoline, means connected to the feed forward signal means and to the feedback signal means for providing the feed forward signal as the control signal for a predetermined time interval at some predetermined time after a substantial change in the raw crude oil propane content has occured and in accordance with the sensed raw crude oil propane content signal P_F and for providing the feedback signal as the control signal when not providing the feed forward signal as the control signal, and means receiving the control signal and the sensed temperature signal T_A for controlling the heater in accordance with said signal so as to control the temperature of the second processed liquid being fed back to the second tower.

3,976,180

MATRIX PRINTER COMPRISING ONE OR MORE STACKABLE GROUPS OF PRINTING WIRES

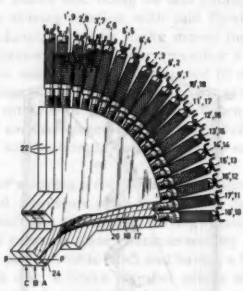
Gerard Andre Jorigny, Villiers-sur-Marne; Jacques Royer, Vincennes, and Georges Edmond Trichard, Chennevieres-sur-Marne, all of France, assignors to U.S. Philips Corporation, New York, N.Y.

Filed July 10, 1974, Ser. No. 487,017

Claims priority, application France, Apr. 9, 1973, 73.12671

Int. Cl.² B41J *1/18*

U.S. Cl. 197—1 R **3 Claims**



1. A matrix printer which comprises a plurality of modules in a side by side contacting arrangement, each module comprising a plurality of printing wires, each printing wire having a printing end and an other end, each printing end of said plurality of printing wires in each module being disposed in a first plane in parallel relationship with uniform spacing between adjacent wires; each module comprising a synthetic material housing carrying and guiding said wires; a plurality of electromagnets carried by each said synthetic material housing, one of said electromagnets engaging said other end of each of said wires remote from said printing end and selectively axially displacing said wire for printing, said electromagnets and said other ends of said wires being disposed in a second plane, said first and second planes in each module being disposed in perpendicular relation, each synthetic material housing having a thickness dimension measured in said first plane equal to the number of wires disposed in each of said modules times the center to center distance between adjacent wires, said electromagnets having a thickness measured in a plane parallel to said first plane no greater than said thickness dimension of said synthetic material housing, each of said first planes being disposed in coplanar relation for said

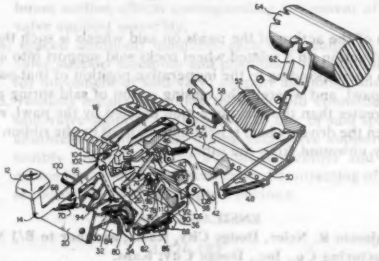
plurality of modules within said matrix printer, said plurality of printing wires in each module being disposed equidistant measured in said first plane from the extremities of said module whereby adjacent printing ends in adjacent modules are disposed with the same center to center spacing as the center to center spacing of the printing ends within the same module.

3,976,181

TYPING MACHINE REPEAT KEY ACTION

Mueller Hans W., Cortland; Howard F. Sherman, McGraw, and Richard E. Shattuck, Cortland, all of N.Y., assignors to SCM Corporation, New York, N.Y.

Filed Aug. 28, 1974, Ser. No. 501,123
Int. Cl.² B41J *23/06*
U.S. Cl. 197—17 **15 Claims**



1. In a typing machine of the kind having means for actuating a typing machine operation, a key lever movably mounted in the typing machine, a repeat interposer, means for supporting the repeat interposer, and means for shifting the repeat interposer upon depression of the key lever to a repeat position, in combination, the improvement comprising:

a. a cam follower surface on the repeat interposer;

b. a rotor rotatably mounted in the typing machine; and

c. means on the rotor for camming the cam follower surface on the repeat interposer to cause the repeat interposer to engage the actuating means to actuate the typing machine operation at a predetermined time during each revolution of the rotor when the key lever is in the repeat position.

3,976,182

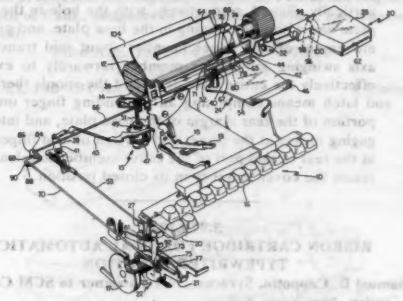
AUTOMATIC FUNCTION MECHANISM FOR TYPEWRITERS

Samuel D. Cappotto, Syracuse, N.Y., assignor to SCM Corporation, New York, N.Y.

Filed June 23, 1975, Ser. No. 589,728
Int. Cl.² B41J *19/62, 33/02*
U.S. Cl. 197—91 **28 Claims**

1. In a typewriter which includes operational means for said typewriter to perform at least one typewriter function for causing the alignment of a selected platen impact point relative to the typewriter print point and having means for receiving a cartridge, that improvement which comprises;

means disposed in the typewriter and engageable by the cartridge for actuating said operational means upon insertion and removal of the cartridge into the typewriter to thereby perform at least a selected one of said functions.

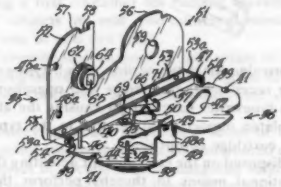


3,976,183

TYPEWRITER RIBBON SUPPLY ADAPTER FOR REPLACEABLE RIBBONS

Lester K. Fleischmann, Highland Park; William J. Kenney, Villa Park, and David L. Fleischmann, Northbrook, all of Ill., assignors to Standard Manifold Company, Chicago, Ill.

Filed Feb. 18, 1975, Ser. No. 550,547
Int. Cl.² B41J *35/28*
U.S. Cl. 197—151 **17 Claims**



1. An adapter for mounting a replaceable ribbon in a typewriter which has means to releasably retain a ribbon cartridge that contains a supply spool, a take-up spool, and a run of ribbon which extends outside the cartridge between said supply and take-up spools so that said run may be threaded through the typewriter ribbon guides, and which typewriter further has a supply spindle and take-up spindle that receive the supply spool and the take-up spool, respectively, said adapter comprising, in combination:

a rigid base plate which has a forward edge and a rear margin, said base plate being engageable by the retaining means of the typewriter to releasably mount the adapter in the typewriter, said base plate having a hole to receive the supply spindle and an opening which receives the take-up spindle, said base plate in the area surrounding the hole and in the area surrounding the opening being large enough to underlie a full ribbon supply spool and a full ribbon take-up spool, respectively;

a generally planar cover member which has a forward edge, a rear margin, a first cover opening and a second cover opening and has a closed position where it is effectively parallel to the base plate and in confining relationship to ribbon wound on spools above said base plate;

hinge means at the forward edges of the base plate and of the cover member mounting the cover member for pivotal movement about a transverse axis closer to the plane of the base plate, than to the plane of said cover said cover member in its closed position having its forward edge generally vertically aligned with the forward edge of

the base plate, having a part of its rear margin generally vertically aligned with a portion of the rear margin of the base plate, and having its first and second cover openings vertically aligned, respectively, with the hole in the base plate and with said opening in the base plate, and pivotal movement of said cover member about said transverse axis swinging said cover member forwardly to expose effectively the entire base plate and the spools thereon;

and latch means comprising an upstanding finger on said portion of the rear margin of the base plate, and interengaging means at the upper end portion of said finger and at the rear of said part of the cover member to releasably retain the cover member in its closed position.

3,976,184

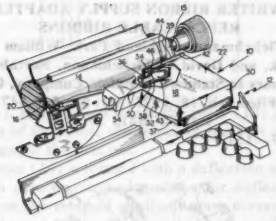
RIBBON CARTRIDGE FOR DUAL AUTOMATIC TYPEWRITER FUNCTION

Samuel D. Cappotto, Syracuse, N.Y., assignor to SCM Corporation, New York, N.Y.

Filed June 23, 1975, Ser. No. 589,729

Int. Cl.² B41J *33/02*

U.S. Cl. 197—151 **8 Claims**



1. A cartridge for a typewriter, which typewriter includes means for receiving the cartridge and operational means to perform a typewriter function for causing the alignment of a selected platen impact point relative to the typewriter print point, the cartridge comprising:

means disposed on the cartridge for actuating the typewriter operational means to thereby perform the typewriter function upon insertion and again upon removal of the cartridge.

3,976,185

TYPEWRITER RIBBON CONVEYING MECHANISM

Otto Aebi, Yverdon, Switzerland, assignor to Hermes Precisa International S.A., Yverdon, Switzerland

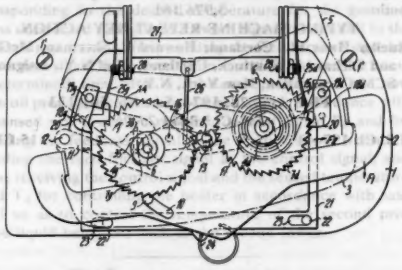
Filed Nov. 18, 1974, Ser. No. 525,017

Claims priority, application Switzerland, Nov. 20, 1973, 16318/73

Int. Cl.² B41J *33/48*

U.S. Cl. 197—162 **4 Claims**

1. A ribbon conveying mechanism for a typewriter including a printing head carriage, said mechanism comprising a mounting plate, a support mounted on said plate, a cassette mounted on said support, said cassette including a ribbon and two hubs, means for alternately driving each of said hubs to wind the ribbon on the driven hub, said cassette support pivotally mounted for tipping between first and second positions, spring means for biasing the support into either of said first and second positions, said driving means comprising two toothed wheels mounted on said pivotally mounted support, driving pawls cooperating with each of said toothed wheels, connecting means securing each cassette hub to each toothed wheel for rotation therewith, a spring blade for each toothed wheel and cooperating with its related toothed wheel to prevent return movement thereof, control means responsive to the position of said support and engageable with said pawls to render them alternately inoperative, said control means comprising a stirrup member having two arms, said stirrup member being mounted on the carriage for translational movement between a first position in which one arm disengages one driving pawl and the corresponding spring blade from one toothed wheel and a second position in which the other arm disengages the other driving pawl and the corresponding spring blade from the other toothed wheel, wherein the direction of the action of the pawls on said wheels is such that the pawl action on a related wheel rocks said support into a position corresponding to the inoperative position of that particular pawl, and wherein the biasing action of said spring means is greater than the rocking action exerted by the pawl, except when the driven wheel is held immobilized by the ribbon being fully unwound from the other hub.



3,976,186

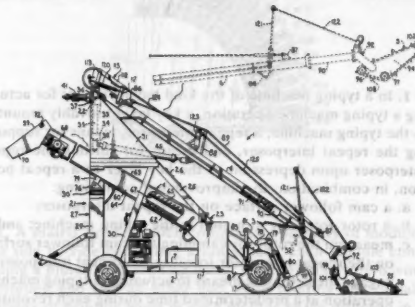
ENSILAGE LOADER

Benjamin R. Neier, Dodge City, Kans., assignor to B/J Manufacturing Co., Inc., Dodge City, Kans.

Filed Feb. 24, 1975, Ser. No. 552,443

Int. Cl.² B65G *65/06*

U.S. Cl. 198—8 **6 Claims**



1. An ensilage loader comprising:

a. a mobile frame having a superstructure carried thereby;

b. an elongated sectional boom with one section having a mounting portion at one end thereof and another section having a free end portion remote from said one section, said other section being movably supported by said one section for longitudinal extension and contraction of said boom;

c. means on said superstructure pivotally mounting said boom mounting portion of said one boom section;

d. extensible means on said superstructure and connected to said one boom section and operative for selective up and down swinging movement of said boom;

e. digger means mounted at the free end portion of said other boom section having movable blades operable to cut a face of an ensilage body engaged thereby as said boom is swung downwardly, the transverse line of the cut

being substantially normal to the longitudinal line of said boom;

f. boom extending means operatively connected between said one boom section and said other boom section for extending and contracting said sectional boom;

g. means responsive to raising and lowering of said boom for actuating said boom extending means to extend the boom and contract the boom at a predetermined rate as said boom is raised and lowered respectively above a horizontal position to permit said digger means to provide a cut without an overhang at an upper portion of the ensilage body; said means comprising:

1. a valve operatively connected to said boom extending means and having means for controlling extending and contracting said sectional boom, said means for controlling extending and contracting said sectional boom having a neutral position;
2. a valve support assembly pivotally mounted on said boom and having said valve mounted thereon;
3. movement transmitting linkage extending between and operatively connected to said other boom section and to said means for controlling extending and contracting said sectional boom whereby movement of said other boom section effects corresponding movement of said valve support assembly;
4. spaced abutment members each engageable by said valve support assembly and positioned to define limits for movement of said valve support assembly; and
5. resilient means extending between and connected to said valve support assembly and to one of said spaced abutment members for urging said valve support assembly toward said one abutment member and said means for controlling extending and contracting of said sectional boom to the neutral position.

3,976,187

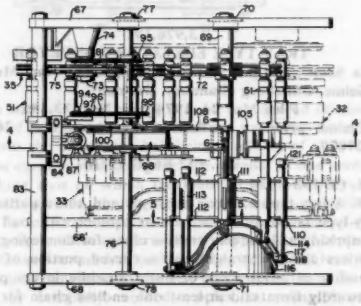
RECIPROCATING PUSHER FOR TRANSFERRING ARTICLES BETWEEN CONVEYORS

Wesley J. Szpitalak, Palos Park, Ill., assignor to Continental Can Company, Inc, New York, N.Y.

Division of Ser. No. 242,110, April 7, 1972, Pat. No. 3,786,747, which is a division of Ser. No. 501,372, Oct. 22, 1965, Pat. No. 3,683,799. This application Sept. 24, 1973, Ser. No. 399,829

Int. Cl.² B65G *47/00*

U.S. Cl. 198—24 **8 Claims**



1. An apparatus for placing can bodies on mandrels carried by a moving endless chain, said apparatus comprising a turret having pockets for receiving and supporting can bodies, said pockets moving in alignment with said mandrels for a portion of the mandrel travel, and pushers for pushing can bodies from said turret pockets onto said mandrels.

3,976,188

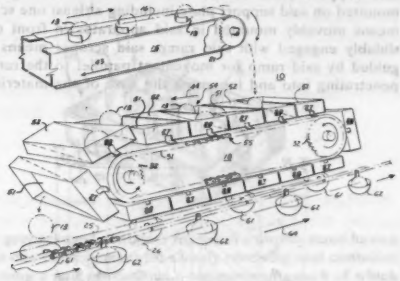
DISTRIBUTING AND PROCESSING APPARATUS

Frank J. Herrera, Downey, and Rodger G. Ponce, Los Angeles, both of Calif., assignors to Casa Herrera, Inc., Los Angeles, Calif.

Filed Aug. 13, 1974, Ser. No. 497,006

Int. Cl.² B65G *47/26*

U.S. Cl. 198—31 AA **9 Claims**



1. Apparatus for transporting a series of objects in two paths, comprising in combination:

a series of containers for successively receiving said objects;

means for advancing said series of containers in an endless path;

means for depositing said objects in successive ones of said advancing containers;

means in odd-numbered ones of said series of containers including a first container for causing movement of deposited objects in said odd-numered containers and toward one of said two paths;

means in even-numbered ones of said series of containers for causing movement of deposited objects in said even-numbered containers and toward the other of said two paths;

endless conveying means including a series of first means for receiving objects from said odd-numbered containers, and a series of second means, staggered relative to said first means, for receiving objects from said even-numbered containers; and

means coupled to said advancing means and to said first and second means for advancing said first means in said one path in alignment with odd-numbered containers, and for advancing said second means in said other path in alignment with even-numbered containers.

3,976,189

INSTALLATION FOR HANDLING STOCK-PILED FRAGMENTARY MATERIALS

Jean Sabes, Anzin, France, assignor to Societe Anonyme Dite: J. Sabes & Cie, Anzin, France

Filed Dec. 26, 1974, Ser. No. 536,398

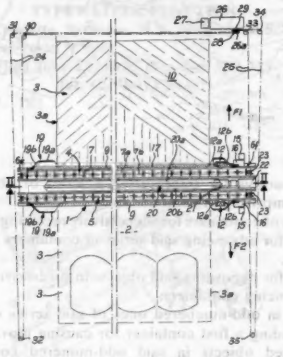
Claims priority, application France, Jan. 2, 1974, 74.00058

Int. Cl.² B65G *65/28*

U.S. Cl. 198—36 **18 Claims**

1. Apparatus for handling stock-piled fragmentary materials such as products of mines and quarries arranged in heaps over a storage area of generally rectangular shape, said apparatus comprising a rigid support plate adapted to rest on a part of the storage area in front of one side of the heap of material, parallel to one side of the storage area, with the support plate extending over the whole width of and beyond the storage area occupied by the heap; at least one endless conveyor mounted on the support plate parallel to the longitudinal side of said support plate; said conveyor having a length substantially equal to the length of the support plate; a guiding and tipping ramp mounted on said support plate adjacent the conveyor on the side thereof facng the heap of materials to be

handled, said ramp extending along said support plate for a predetermined length at least as great as the width of the heap to be handled and having a height which is substantially equal to the height of the support plate and conveyor; shifting means for moving said support plate and conveyor thereon in at least one direction perpendicular to the length of the conveyor and parallel to the storage area; said shifting means being located outside of the storage area and being operatively connected to said support plate at the ends thereof; loosening means mounted on said support plate including at least one scraping means movably mounted in said apparatus in front of and slidably engaged with said ramp, said scraper means being guided by said ramp for movement parallel to the ramp for penetrating into and loosening the base of the material in a



heap in front of the ramp, and drive means for moving said scraping means in at least one direction along the guide ramp; a retaining beam fixed on the support plate parallel to said conveyor and adjacent to the side of the conveyor opposite from said guide ramp, said beam serving to rigidify the support and to hold back and return possible falls of materials beyond the conveyor; and a guide slide for said scraper means comprising a straight rod secured to the horizontal upper portion of said guide ramp, said loosening means including means for slidably mounting the scraper means on the rod and at least partly surrounding the rod whereby said scraper means is guided in its movement by engagement with said guide ramp and by said rod and any tilting or wedging of the scraper means with respect to the ramp and to the guide slide is prevented.

3,976,190

DRUM STORAGE DEVICE

Alfred Schmermund, 62 Kornerstrasse,, 5820 Gevelsberg, Germany

Filed Jan. 7, 1975, Ser. No. 539,141

Claims priority, application Germany, Jan. 22, 1974, 2402855

Int. Cl.² B65G *43/08*

U.S. Cl. 198—37 **7 Claims**

1. A buffer store device for storing a plurality of packages comprising, in combination:

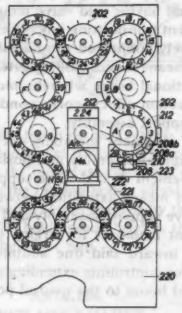
a frame;

a seriate plurality of storage drums each mounted on said frame to be rotatable about a respective one of spaced apart and mutually parallel axes, each drum comprising a cylindrical surface and a plurality of wall members each projecting outwardly from said cylindrical surface, said wall members defining a plurality of open cells disposed around the periphery of said drum, each cell being adapted to accommodate a row of said packages disposed in end-to-end relationship;

drive means to synchronously rotate next adjacent ones of said drums in mutually opposite directions to cause said packages to interact with said wall members and thereby to be displaced along a serpentine path having portions extending between the peripheries of next adjacent ones of said drums and to cause wall members of mutually facing cells of next adjacent ones of said drums to extend substantially simultaneously into said portions of said path to effect transfer of a row of said packages between said mutually facing cells, said serpentine path terminating at the periphery of a last one of said storage drums;

guide means to guide said packages during transfer of said rows thereof between next adjacent ones of said drums;

control means to condition said drive means to rotate a first of said drums in a selected one of two mutually opposite directions of rotation; and



a belt conveyor disposed in operative juxtaposition with the periphery of a first of said drums to convey said packages along a path which on said first drum being in any one of a plurality of predetermined angular positions extends through a respective one of said cells at said periphery in a direction parallel to said axes, whereby on said first drum being rotated in a first direction rows of said packages are transferred successively by interaction with said wall members from said belt conveyor to said cells of said first storage drum and are passed along said serpentine path and on said first drum being rotated in a direction opposite to said first direction rows of said packages are passed back along said serpentine path and are transferred successively from said cells to said belt conveyor.

3,976,191

TRAY-TYPE ELEVATOR CONVEYOR

Blaz Santic, Burgau, Germany, assignor to Karl Mengele & Sohne, Gunzburg (Danube), Germany

Filed May 24, 1974, Ser. No. 473,185

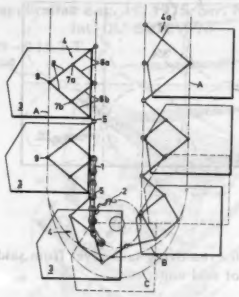
Claims priority, application Germany, May 26, 1973, 2327077

Int. Cl.² B65G *17/16*

U.S. Cl. 198—154 **9 Claims**

9. A tray-type elevator conveyor and, more particularly, a tray-type conveyor for a rack or cabinet with load carriers, comprising at least one endless chain for conveying the load carriers along a straight and a curved portion of travel, a plurality of outer pairs of outer straddle levers projecting outwardly from said at least one endless chain for carrying said load carriers, a plurality of central pivots, each central pivot pivotally connecting one end of one outer straddle lever of one said pair with one end of the other outer straddle lever of the pair, each central pivot also pivotally connected to one load carrier, and a plurality of inner sets of inner straddle levers, each of said inner sets of inner straddle levers comprising a first set of levers having one end pivotally connected to the other ends of one of said plurality of outer pairs of outer

straddle levers, and a second set of levers having one end pivotally connected to said at least one endless chain and the other end pivotally connected to the other end of said first set



of levers, so that the speed of the load carrier in the curved portion of travel is substantially the same as the speed of the load carrier in the straight portion of travel.

3,976,192

SLAT CONVEYOR

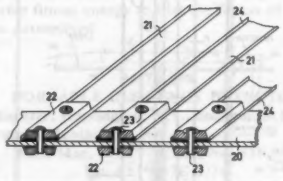
Hugo Stefan Muller, Oettinger Str. 9, D-886 Nordlingen, Germany

Filed May 3, 1974, Ser. No. 466,689

Claims priority, application Germany, May 8, 1973, 2323601

Int. Cl.² B65G *15/30*

U.S. Cl. 198—195 **13 Claims**



1. In a slat conveyor having at least two spaced drums, at least one of which is driven for rotation, a slat conveyor belt guided over the drums, the belt being made up of a plurality of endless carriers arranged generally parallel to one another with spacing slats on which the material to be conveyed is transported secured thereto, the improvement comprising elongate flattened ribs equal in number to the number of slats secured to the endless carriers directly opposite and centrally of each slat and secured to each endless carrier in at least two spaced points transverse to the belt and lengthwise of the rib and slat by integrally molded nipples extending through spaced holes in the belt said nipples being rounded above the belt surface to engage frictionally and resiliently in rounded openings in the slats whereby relative shifting of the endless carrier, slat and rib is prevented and a plurality of recesses in the driven drum corresponding to the elongate flattened ribs in size and spacing whereby each rib is engaged as the drum rotates to move the endless carriers and slats.

3,976,193

CONTAINER FOR HOLDING FLAT PARALLELIPIPEDIC ARTICLES

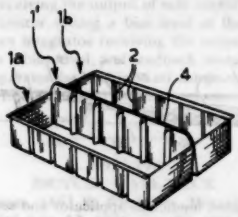
Amilcare Dogliotti, Neive (Cuneo), Italy, assignor to P. Ferrero & C. S.p.A., Alba (Cuneo), Italy

Filed Apr. 16, 1975, Ser. No. 568,760

Claims priority, application Italy, Nov. 20, 1974, 53611/74

Int. Cl.² B65D *1/34, 1/00, 85/62*

U.S. Cl. 206—72 **1 Claim**



1. A prepackaged container for use in a display stand having at least one compartment for closely receiving said container comprising a pair of rectilinear compartments each of which has two long sides, two short sides and a bottom and a plurality of flat parallelipipedic articles disposed side by side in each compartment to completely fill each compartment, said container being constructed in one piece from thin flexible plastic material with the two short sides and the bottom of each compartment being substantially smooth and flat with the two long sides of each compartment being formed with vertically extending spaced apart corrugations providing a plurality of spaced apart ribs on the inside surfaces of said long walls, said ribs being located between adjacent articles for holding said articles in upright position in said compartment in the absence of one or more articles from the row in said compartment, said compartments being disposed side by side with only the top edges of two adjacent long sides being integrally joined by a narrow strip of said thin flexible material.

3,976,194

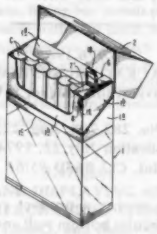
COMBINED CIGARETTE PACK AND DISPOSABLE LIGHTER

Adolfo Arias Loredo, Apartado 741, Panama, Panama

Filed Aug. 10, 1973, Ser. No. 387,373

Int. Cl.² A24F *15/18*; F23D *3/18*

U.S. Cl. 206—87 **9 Claims**



7. A cigarette pack comprising an elongated container for cigarettes and having an end adapted to be opened to withdraw cigarettes therefrom, and a lighter structure including a supporting wall with a laterally turned section overlapping said open end portion of the pack, said section having an opening therein, a fuel reservoir carried between the supporting wall and the container, means for directing fuel from said reservoir to the opening, and igniting means for the fuel.

3,976,195

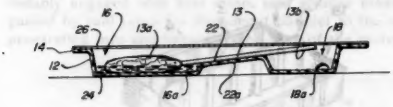
SEALED PACKAGE OF SWAB OR APPLICATOR STICK AND MEDICINAL MATERIAL TO BE APPLIED THEREBY

Sheldon S. Cohen, Chicago, Ill., assignor to Modern Medical Concepts, Inc., Chicago, Ill.

Continuation-in-part of Ser. No. 461,912, April 18, 1974, abandoned. This application Feb. 26, 1975, Ser. No. 553,110

Int. Cl.² B65D *81/02*

U.S. Cl. 206—362 1 Claim



1. A combination medicinal applicator and sealed package assembly therefor comprising: at least one applicator element having a liquid absorbent applicator head portion for applying a medicinal material and an elongated handle portion for handling the same; a sealed package enclosing said at least one applicator element comprising an initially open top tray-like body made of rigid material and initially having an opening in the top thereof through which the applicator element can pass into and from the body, said body having a rigid peripheral ledge extending around the same, said body having in the bottom thereof an applicator head-receiving well into which the head portion of said applicator element extends and support means above the bottom of said body tray and below said ledge inclined upwardly from said well upon which the handle portion of said applicator element is supported an end portion of said handle being adjacent a finger-receiving well so that the handle can be readily grasped, said wells being unsealed from each other, a medicinal material wetting at least part of the head portion of said applicator element to a point where it is not super-saturated so the well is free of any flowable body of such material; and a manually removable cover-forming means comprising a sheet of flexible material sealed along said peripheral ledge, and enclosing the open top of said body to provide a gas and liquid tight seal with said body so the applicator element is sealed from the exterior of the package; said head portion of the applicator element being spaced from said cover sheet in said well when said tray-like body is upright so a downward force on said cover sheet is not applied to said head portion of said applicator element and said applicator head portion is also protected from an external force by the rigid walls of the tray-like body when the body is inverted.

3,976,196

PACKAGING SYSTEM

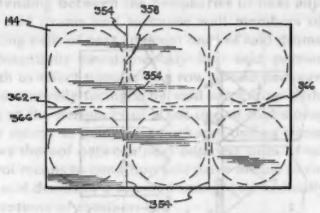
Martin Mueller, Glenview, Ill., assignor to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 282,758, Aug. 22, 1974, Pat. No. 3,838,550. This application July 22, 1974, Ser. No. 490,362

Int. Cl.² B65D *85/62*

U.S. Cl. 206—526 7 Claims

1. A package for storing a product comprising a plastic container having a circular bottom wall and a side wall extending upwardly therefrom with a circular rim extending outwardly from the upper end of said side wall, said rim defining a generally flat upper surface having a circular peripheral edge, and a cover including a rectangular flexible sheet of film having sealing characteristics on one surface with said surface sealed to only said flat upper surface, said sheet being formed of a material that is capable of taking on a permanent set and said sheet having a peripheral edge extending beyond said rim and being tucked around said circular peripheral edge of said flat upper surface and under said rim, said rectangular sheet having generally triangularly shaped corners extending substantially below said rim and each corner being free from said container below said circular peripheral edge to define a



gripping member for removing said cover from said container to allow removal of said contents.

3,976,197

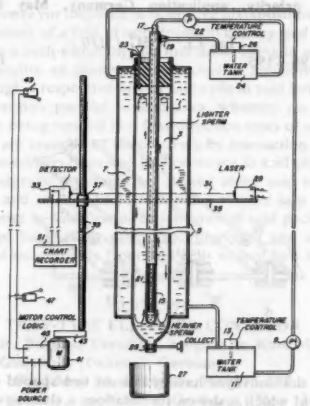
THERMAL CONVECTION COUNTER STREAMING SEDIMENTATION METHOD AND APPARATUS FOR CONTROLLING THE SEX OF MAMMALIAN OFFSPRING

Bhairab C. Bhattacharya, 5016 S. 87th St., Omaha, Nebr. 68127

Filed Nov. 22, 1974, Ser. No. 526,378

Int. Cl.² B03B *5/00*

U.S. Cl. 209—11 9 Claims



1. An apparatus for separating particles of differing densities suspended in a medium comprising:

a sedimentation column;

means for introducing into said sedimentation column a medium containing particles of differing densities suspended therein;

means adjacent to said sedimentation column for producing a temperature differential between two portions of the medium contained in said sedimentation column, whereby a thermal convection counter stream is created; and

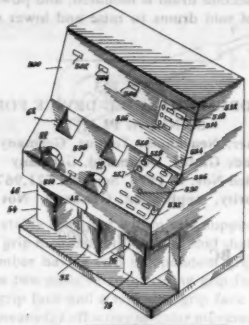
means for removing desired fractions of said medium from said sedimentation column.

3,976,198

METHOD AND APPARATUS FOR SORTING CURRENCY

W. Robert Carnes, Jr., Darien; Lester L. Selnick, Ridgefield, and John Balogh, Jr., Trumbull, all of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.

Continuation of Ser. No. 457,366, April 2, 1974, abandoned.
This application Aug. 11, 1975, Ser. No. 599,982
Int. Cl.² B07C 5/10
U.S. Cl. 209—111.7 T 9 Claims



1. A method for examining and determining the wear characteristics and fitness of currency bills which can be soiled, worn, damaged, and the like, comprising the steps of:

transporting a bill through an examination station;

projecting a beam of light at the bill as the bill is transported through said station, said beam of light bathing substantially the entire surface of the bill with light;

sensing the intensity of light transmitted through said bill at said station and providing an electrical signal indicative of said intensity;

integrating said electrical signal to form an integrated electrical signal indicative of substantially the entire energy of the light transmitted through said bill; and

comparing the integrated signal of the intensity signal with a signal of predetermined magnitude representative of a passable fitness energy so that the fitness of the examined bill is determined.

3,976,199

PORTABLE CURRENCY DETECTOR

Jacob Schachter, Huntington, N.Y., assignor to Ketek Electric Corporation, Huntington, N.Y.

Filed Mar. 17, 1975, Ser. No. 558,904
Int. Cl.² B07C 3/16
U.S. Cl. 209—111.8 1 Claim

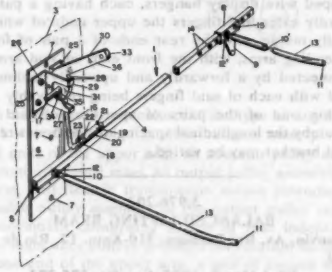
1. A portable self-powdered currency detector device comprising: a casing element, a narrow band pickup projecting outwardly of said casing element, a narrow band regenerative amplifier disposed within said casing element, and connected to and receiving the output of said pickup, electrically powered indicator means carried by said casing element, and comparator means actuated by the output of said amplifier in series with said indicator means; whereby upon the positioning of a bill printed with a magnetic ink upon said pickup, and the manual rectilinear movement of the same past said pickup, a signal is generated of varying frequency, at least a part of which corresponds to the tuned frequency of said pickup said comparator receiving the output of said amplifier; said device including a resistor setting a bias level at the input to said comparator, an integrator receiving the output of said comparator above a bias level, and feedback means incorporated into said comparator for latching said comparator in conducting condition to operate said indicator means when a valid bill is presented.

3,976,200

BICYCLE WALL RACK

Robert K. Munns, 1661 W. 83rd Ave., Denver, Colo. 80221

Filed Aug. 13, 1975, Ser. No. 604,224
Int. Cl.² B62H 3/02
U.S. Cl. 211—18 9 Claims



1. A collapsible rack for removably supporting cycles relative to a vertical wall surface comprising an elongated horizontal bar, outwardly projecting spaced rods, one of said rods being removably connected to said bar, and the other of said rods being removably connected to a sleeve, said sleeve being slidably arranged on said bar, a latch assembly plate secured to said wall surface adjacent one of said rods, one end of said horizontal bar being hinged to said plate, said sleeve being hinged to said wall surface, a latch member on said plate and having a recess therein, lifting bar means pivotally mounted on said bar and engageable with said latch member, and a latching lever pivotally mounted on said latch member and having a slot therein for receiving said lifting bar when the latter is elevated relative thereto whereby said lifting bar, horizontal bar and lifting rods are latched in horizontal elevated position to receive a cycle thereon.

3,976,201

SUPPORTING AND DISPLAYING APPARATUS FOR MERCHANDISE ITEMS

Robert J. Hodgson, Lomita, and Henry Clark, Gardena, both of Calif., assignors to Pacific Electricord Company, Gardena, Calif.

Filed Mar. 12, 1975, Ser. No. 557,483
Int. Cl.² A47F 5/00
U.S. Cl. 211—59 2 Claims

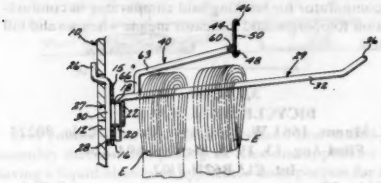
1. Supporting and display apparatus for temporarily retaining a plurality of merchandise items on a perforated vertical wall of a gondola or the like, said apparatus comprising:

an elongated horizontal bracket having upper and lower vertical walls that are integrally connected by top and bottom horizontal legs that project forwardly from said

upper and lower walls and a vertical web that bridges the front of said legs;

a plurality of vertically aligned pairs of longitudinally spaced apertures formed through said legs;

fastening means on said bracket for removably attaching said bracket to a gondola or the like, said fastening means including a pair of longitudinally spaced mounting straps which longitudinally slidably receive said mounting bracket, with a pair of upstanding prongs being attached to said mounting straps and extending rearwardly and upwardly through the perforations of said vertical wall; and



a plurality of merchandise-supporting generally hairpin-shaped wire display hangers, each having a pair of upwardly extending fingers the upper ends of which integrally merge with the rear ends of a pair of forwardly extending arms, with the front ends of said arms being connected by a forwardly and upwardly inclined loop, and with each of said fingers being removably inserted within one of the pairs of apertures of said bracket whereby the longitudinal spacing of said hooks relative to said bracket may be varied.

3,976,202

BALANCED LIFTING BEAM

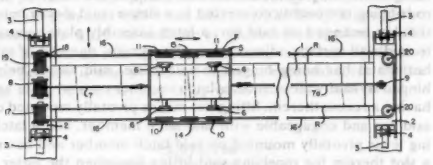
Rene Bauvin, Av. Rui Barbosa, 310-Apto. 17, Rio de Janeiro, Brazil

Filed May 7, 1975, Ser. No. 575,373

Claims priority, application Brazil, Oct. 22, 1974, 8788

Int. Cl.² B66C *17/00*

U.S. Cl. 212—27 **2 Claims**



1. In an overhead crane installation including spaced apart parallel rails mounted on a supporting structure, a single traveling beam spanning the space between said rails, said beam including spaced apart parallel rails, a carriage at each end of said beam, wheels mounted on said carriage and riding on said installation rails, a trolley mounted on said beam, said trolley including a frame, a pair of wheels mounted on each side of said frame and movable over the rails of said beam, a first rotatable drum mounted at one end of said traveling beam, a first cable having one of its ends secured to said first drum and the other end secured to said trolley, a pulley mounted at the opposite end of said beam, a second cable having one of its ends secured to said first drum, said cable returning around said pulley at the opposite end of said beam and having the other of its ends secured to the opposite end of said trolley, a hoist block mounted on said trolley frame, said hoist block comprising a pair of pulleys mounted on each side of said trolley frame, a transverse hoist beam including a pulley mounted at each end thereof and a hook suspended therefrom, a second drum mounted on one of said carriages at one end of said traveling beam, a pair of return pulleys mounted on the other of said carriages at the opposite end of said traveling beam, a third cable having one end fixed to said drum and passing over one pair of said hoist pulleys, then passing over one of said transverse hoist beam pulleys around each of said return pulleys and over the other pair of hoist pulleys and the other of said transverse hoist beam pulleys and connected at its opposite end to a fixed point on said carriage on which the second drum is mounted, and power means for rotating one of said drums to raise and lower said hook as required.

3,976,203

CAN OR DRUM CHANGING DEVICE FOR FIBER SPINNING PLANTS

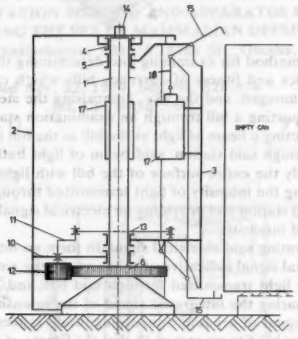
Gerhard Hegner, Neuenhain, Taunus, Germany, assignor to Friedrich Unde GmbH, Dortmund, Germany

Filed Nov. 8, 1974, Ser. No. 521,967

Claims priority, application Germany, Nov. 17, 1973, 2357428

Int. Cl.² D01D *7/00*

U.S. Cl. 214—1 BC **6 Claims**



1. Device for filling cans or drums with multi-fibre yarn, including;

1. a multi-fibre yarn feeding station,
2. a lifting device for a can in filling position,
3. a rotatable housing on which said lifting device is mounted for moving a can to said feeding station,
4. a lifting device for a succeeding can to be filled,
5. a rotary support section movable concentrically to said housing and on which said second lifting device is mounted,
6. a support column common to said housing and support,
7. a ring gear fixed to said column,
8. a motor on said housing operatively connected to said ring gear for rotating said housing and support section,
9. A crank gear connected to be driven by said ring gear, and
10. a connecting rod operatively connecting said crank gear and said support section, whereby an additional rotary motion is imparted to said support section relative to said support housing.

3,976,204

MECHANICAL HANDLING APPARATUS

Ronald John Dawson, Bromsgrove, England, assignor to GKN Forgings Limited, England

Filed Mar. 10, 1975, Ser. No. 557,152

Int. Cl.² B65G *46/06*

U.S. Cl. 214—1 BB **3 Claims**

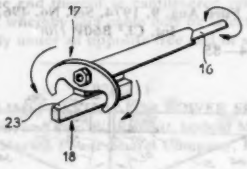
1. A mechanical handling device comprising:

a fixed framework,

a carriage mounted for linear reciprocatory movement upon said framework between a loading station and an unloading station,

a support tube mounted upon said carriage,

a stationary grip member mounted on the support tube at one end thereof, and two independent grip faces provided on said stationary grip member,



a shaft rotatably mounted within said support tube,

a movable grip member mounted on said shaft, the movable grip member having two independent grip faces so that there are two pairs of cooperating grip faces with a stationary grip face and a movable grip face in each pair,

actuating means for effecting angular movement of the shaft relative to the support tube for bringing either one of said pairs of grip faces into operation while the other pair of grip faces is non-operative.

3,976,205

SUCTION DEVICE FOR GRASPING AND HANDLING A GENERALLY PARALLELEPIPEDIC BODY

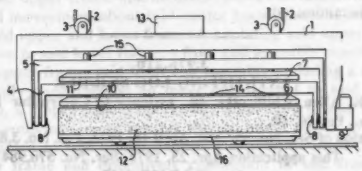
Rolf Erik Göransson, Akarp, Sweden, assignor to Internationella Siporex Aktiebolaget, Malmo, Sweden

Filed Mar. 14, 1975, Ser. No. 558,587

Claims priority, application Sweden, Mar. 21, 1974, 7403859

Int. Cl.² B65G 7/00

U.S. Cl. 214—1 QD **9 Claims**



1. A suction device for grasping and handling a generally parallelepipedic body comprising:

a. means forming a first suction head member having a first suction face adapted for releasable suctorial adhesion to a first surface of the body that is originally the top thereof,

b. means forming a second suction head member having a second suction face adapted for releasable suctorial adhesion to a second surface of the body that is originally a laterally facing side thereof,

c. carrier means common to said first and second suction head members,

d. means for oscillating said first and second suction head members jointly relative to said carrier means at least approximately 90° about a generally horizontal axis that is at least substantially parallel to both said first and second suction faces, and

e. means for temporarily creating a negative pressure in said first and second suction head members, said suction device leaving two adjoining surfaces of the body opposite to the first and second surfaces thereof, respectively, entirely free so as to permit turning over of the grasped body and depositing of the same on that free side thereof which was formerly facing laterally and away from the second body surface.

3,976,206

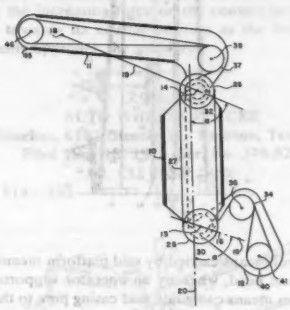
ARTICULATED MASTER SLAVE MANIPULATOR

Carl R. Flatau, 30 Dartmouth Road, Shoreham, N.Y. 11786

Filed July 16, 1975, Ser. No. 596,228

Int. Cl.² B25J 3/00

U.S. Cl. 214—1 CM **9 Claims**



1. In a master-slave manipulator of the type having an upper arm, a lower arm, and a counter-balance mass pivoted at opposite ends of the upper arm, an actuator pulley assembly in the counter-balance mass, an output pulley assembly in the lower arm, and flexible transmission means extending from the actuator pulley assembly to the output pulley assembly; the improvement comprising a pair of first independently rotatable main idler pulleys mounted for rotation about a first axis at one end of the upper arm, a pair of second independently rotatable main idler pulleys mounted for rotation about a second axis at the other end of said upper arm, said main idler pulleys having equal diameters, said counter-balance mass and lower arm being pivotally mounted for rotation about said first and second axes respectively, a pair of first auxiliary idler pulleys mounted in said counter-balance mass for rotation about an axis parallel to said first axis, a pair of second auxiliary idler pulleys mounted in said lower arm for rotation about an axis parallel to said second axis, and means for maintaining a third axis defined by the center of gravity of said counter-balance mass and said first axis parallel to a fourth axis defined by the center of gravity of said lower arm and said second axis, said flexible transmission means extending from said actuator pulley assembly around said first auxiliary idler pulleys in a first rotational sense, thence around said first and second main idler pulleys in that order in a second rotational sense opposite said first rotational sense, thence around said second idler pulleys in said first rotational sense, and thence to said output pulley assembly.

3,976,207

CASING STABBING APPARATUS

Richard A. Schultz, Houston, Tex., assignor to BJ-HUGHES Inc., formerly Byron Jackson, Inc., Houston, Tex.

Filed Apr. 7, 1975, Ser. No. 565,953

Int. Cl.² E21B 19/14

U.S. Cl. 214—2.5 **7 Claims**

1. Casing stabbing apparatus for running casing pipe into a well bore, the combination comprising:

a casing handling head for grasping a generally upright section of casing pipe, said head being controllably movable along two intersecting horizontal axes extending over said well bore and along a vertical axis;

platform means attached to said head for movement therewith and for supporting an operator thereon;

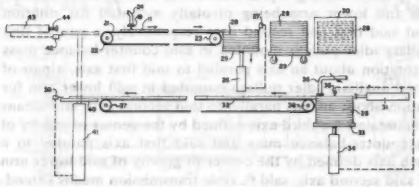
and control means carried by said platform means for operating said head, whereby an operator supported on said platform means can guide said casing pipe to the stabbing position and then release the same by operating said control means.

3,976,208

APPARATUS FOR PROVIDING ENDLESS SUCCESSION OF COMPARTMENTED TRAYS

Louis F. Buix, Crystal Lake; Harry J. Gribnitz, Addison, and Gary A. Hohner, Sleepy Hollow, all of Ill., assignors to The Quaker Oats Company, Chicago, Ill.

Filed Feb. 3, 1975, Ser. No. 546,609
Int. Cl.² B65G *60/00*
U.S. Cl. 214—6 H **1 Claim**



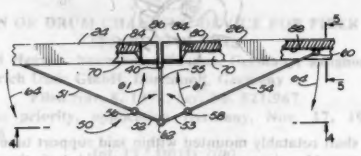
1. An apparatus for providing an endless succession of stackable, compartmented trays for holding items to be processed, said apparatus comprising: a first conveyor for moving a plurality of trays, said first conveyor having a first end and a second end; means for moving the first conveyor in a first direction; means for depositing articles in said trays; means for stacking trays received from said first conveyor; first sensing means operable to lower said stacking means a predetermined distance; means for destacking the trays; means for transferring the stacked trays to said destacking means; means for removing items from said trays; a second conveyor located below said first conveyor for receiving empty trays from said destacking means; a second sensing means operable to raise said destacking means a predetermined distance so that said trays can be received by said second conveyor; means for moving the second conveyor in a direction opposite to the direction of movement of the first conveyor and at a rate such that the rate of trays leaving the second conveyor is at least equal to the rate of trays leaving the first conveyor; means for directing said compartmented trays end on end onto the first end of the first conveyor; transfer means for moving the trays on the second conveyor to the means for directing compartmented trays end on end onto the first end of the first conveyor; a third sensing means operable to raise said transfer means a predetermined distance.

3,976,209

PICK-UP TRUCK LOADING RAMP

Edward E. Burton, 19418 Lemarsh St., Northridge, Calif. 91324

Filed Aug. 9, 1974, Ser. No. 496,048
Int. Cl.² B60P *1/00*
U.S. Cl. 214—85 **8 Claims**



1. A loading ramp for trucks having an end-gate, said ramp comprising:

two foldable ramp members;

first means pivotally connecting one of said ramp members to said end-gate;

hinge means pivotally connecting said ramp members to one another;

foldable supporting means connected to said hinge means and pivotally connected to said foldable ramps for reinforcing said hinge means and said ramp members when said ramp members are extended solely by its structure and connection to said hinge means and said ramps, said supporting means being adapted to support loads on said hinge means by distributing the loads internally in said supporting means and ramp members; and

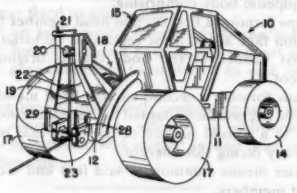
wherein said ramp members have longitudinal grooves enclosing the bulk of said supporting means when said ramp members and said supporting means are folded whereby the space occupied by the folded loading ramp is minimized.

3,976,210

ANTI-TIPPING LOG SKIDDER

Jan K. Allen, Chillicothe, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Division of Ser. No. 352,360, April 18, 1973, Pat. No. 3,899,093. This application Apr. 23, 1975, Ser. No. 570,984
Int. Cl.² B60P *1/52*
U.S. Cl. 214—85.5 **6 Claims**



1. A log skidder disposed on a longitudinal axis thereof comprising

a frame,

a towing winch mounted on said frame and having a cable wrapped thereon,

first cable guide means mounted on and vertically above said frame and positioned rearwardly of said towing

winch, said cable received and guided over said first cable guide means, and

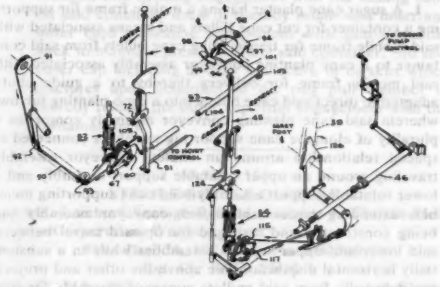
second cable guide means mounted on a lowermost portion of said frame substantially below and in fixed relationship relative to said first guide means and constructed to define an opening for selectively permitting said cable to be placed thereunder from said first guide means to substantially shorten the tipping moment arm of said log skidder during selected phases of operation thereof, said second cable guide means constituting a roller rotatably mounted at only one end thereof in cantilevered relationship on said frame whereby said cable may be selectively moved transversely under an opposite free end of said roller.

3,976,211

MOTION LIMIT SYSTEM FOR POWER SHOVELS

George B. Baron, and Paul W. Padrutt, both of Marion, Ohio, assignors to Marion Power Shovel Company, Inc., Marion, Ohio

Filed Nov. 7, 1974, Ser. No. 521,908
Int. Cl.² E02F *3/32*
U.S. Cl. 214—138 R **34 Claims**



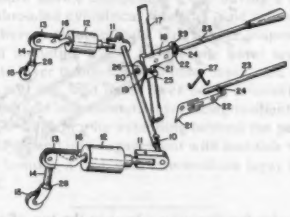
1. In a power shovel including a lower frame provided with a pair of transversely spaced crawler units and a center journal; an upper frame mounted on said lower frame for rotational moveement about said center journal; means mounted on said upper and lower frames for rotating said upper frame relative to said lower frame; a front end assembly mounted on said upper frame, said front end assembly including a stiffleg pivotally connected at an inner end thereof to said upper frame, a dipper handle operatively connected to said stiffleg for pivotal movement relative thereto and a dipper pivotally connected to said dipper handle; a system mounted on said upper frame and operatively connection to said front end assembly for crowding and retracting said dipper, said crowd system including a coomponent movable between predetermined limits proportionally corresponding to predetermined crowd and retract limits of said dipper; a control lever mounted on said upper frame and operatively connected to means for actuating said crowd system, said control lever having operative crowd and retract positions and a neutral position intermediate said crowd and retract positions; a system mounted on said upper frame and operatively connected to said front end assembly for hoisting and lowering said dipper whereby said dipper handle is caused to pivot reltaive to said stiffleg, said hoist system including a component movable between predetermined limits proportionally corresponding to predetermined upper and lower limits of movement of said dipper handle relative to said stiffleg during the hoisting and lowering of said dipper; and a control lever mounted on said upper frame and operatively connected to means for actuating said hoist system, said hoist control lever having operative lowering and hoist positions and a neutral position intermediate said lowering and hoist positions; a system for limiting the motions of said dipper comprising means operatively interconnecting said crowd component and said crowd control lever responsive to a movement of said crowd component between said predetermined limits of movement thereof for increasingly biasing said crowd lever steadily away from an operative position thereof, as said crowd component approaches one of said predetermined limits of movements thereof, and means operatively interconnecting said hoist control lever and said hoist component responsive to a movement of said hoist component between the limits of movement thereof for increasingly biasing said hoist control lever steadily away from an operative position thereof, as said hoist component approaches one of said predetermined limits of movement thereof, whereby the operator is physically alerted to the proximity to the limit of travel of the hoist or crowd components by the increasing force on the control lever tending to move it towards its neutral position as the hoist or crowd components approach the said limit.

3,976,212

AUTO WHEELS PLACER

Ramon Sanchez, 6102 Glencoe St., Houston, Tex. 77017

Filed June 18, 1973, Ser. No. 370,823
Int. Cl.² B65B *29/00*
U.S. Cl. 214—332 **1 Claim**



1. A device to place auto wheels, truck wheels and other vehicles wheels comprising an extensible bar that has two telescopically engaged sections which allow the extension of the said bar, this extensible bar comprising two arms that are connected one to each end of the said bar by means of articulations, said articulations allowing the arms to fold to a position parallel to the extensible bar to facilitate the storage of this device, the said arms comprising two rollers, one on each arm, said rollers being rotatably mounted on the said arms, the function of the said rollers being to support the wheel that is to be placed and to allow it to rotate facilitating its centering on the screws of the brake drums of the auto, truck or other vehicles, the said arms provided with rollers comprising, besides the articulations that connect them to the extensible bar, two other articulations provided with a pawl, said articulations provided with a pawl connecting the said arms to two prolongations that increase the length of said arms, said prolongations ending in two small wheels with swivel joints, one small wheel with swivel joint on each prolongation, the function of the said articulations with a pawl being to allow the said prolongations that end in small wheels with swivel joints to fold to a 90° position in relation to the arms provided with rollers and to form two points of rest or front legs of the auto wheels placer that is being described, the said two points of rest or front legs being fixed to the 90° position by means of the said pawls, the extensible bar comprising in its middle point a rigidly fixed disc to which a case is pivotally connected, a dentated bar which travels through said case and forms the third point of rest or rear leg of the auto wheels placer that is being described, this third point of rest or rear leg being locked at the desired height by means of a claw made up of two parts, said claw made up of two parts being situated inside the said case through which travels the dentated bar, this auto wheels placer being operated by means of a lever or handle comprising a salient that governs the said claw made up of two parts, said claw made up of two parts serving to lock the

dentated bar at the desired height, the said case comprising a curve and concave piece adjacent to the point in which the lever or handle is inserted, the said curve and concave piece forming a tunnel through which travels the salient of the lever or handle and impeding the said lever or handle to become detached when the auto wheels placer is being manipulated.

3,976,213

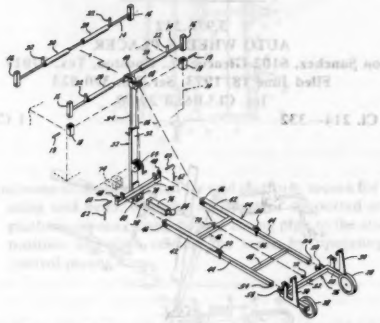
BOAT LOADER

Warren Ball, 106 Ball Airport R.D., Victoria, Tex. 77901

Filed Apr. 2, 1975, Ser. No. 564,536

Int. Cl.² B60P *3/10*; B60R *9/04*

U.S. Cl. 214—450 **11 Claims**



1. A loader for elevating a boat to the top of a vehicle and shifting the boat over its top to a stowed position thereon comprising,

a first load supporting frame provided with means for attaching it to an end of the vehicle and including an upright frame member extending upwardly to adjacent the top of the vehicle,

a wheeled dolly including attachment means for attaching the dolly to the stern of the boat,

a second load supporting frame provided with releasable cable guide means,

means pivotally connecting an outer end of the second load supporting frame to the wheeled dolly,

means for pivotally connecting an inner end of the second load supporting frame to the first load supporting frame,

the second load supporting frame extending a distance substantially equal to the distance from the means pivotally connecting its inner end to the top of the vehicle,

a winch secured to the first load supporting frame,

a pulley secured to the upper end of the upright frame member, and

a cable extending from the winch through the pulley, the releasable cable guide means and having its remote end secured adjacent the stern of the boat,

whereby reeling in of the cable by the winch causes the stern of the boat and the inner end of the second load supporting frame to move upwardly and towards the vehicle until the inner end of the second load supporting frame and the bow of the boat is over the top of the vehicle,

attachment of the inner end of the second load supporting frame to the first load supporting frame, removal of the cable from the releasable cable guide means, and continued reeling in of the cable by the winch causing the outer end of the second load supporting frame to swing upwardly into an upright position, thereby lifting the stern of the boat upwardly and sliding the boat on the top of the vehicle into the stowed position.

3,976,214

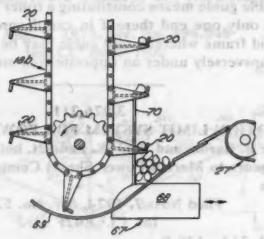
SUGAR CANE PLANTER

Cecil Charles Etwell, High St., Walkerston, Via Mackay, Queensland, Australia

Continuation of Ser. No. 294,700, Oct. 3, 1972, abandoned. This application Nov. 21, 1974, Ser. No. 525,804

Int. Cl.² B60P *1/36*

U.S. Cl. 214—519 **1 Claim**



1. A sugar cane planter having a mobile frame for supporting a container for cut cane billets and means associated with said mobile frame for transporting cane billets from said container to a cane planting conveyor assembly associated with said mobile frame for delivery thereby to a guide chute adapted to direct said cane billets into a cane planting furrow; wherein said cane planting conveyor assembly comprises a plurality of elongate cane supporting members connected in spaced relationship around an endless conveyor assembly traveling around an upper rotatable support assembly and a lower rotatable support assembly, said cane supporting members extending across said endless conveyor assembly and being constructed and arranged for upward travel between said lower and upper support assemblies while in a substantially horizontal disposition one above the other and projecting outwardly from said endless conveyor assembly for supporting thereon a cane billet for travel over said upper support assembly and falling into said guide chute; and wherein a regulating means associated with said cane planting conveyor for regulating the rate of delivery of said cane billets into said guide chute comprises a gauge bar assembly located adjacent said lower support assembly and adapted to extend across said cane supporting members to provide a substantially vertical cane billet abutting face, said gauge bar assembly being selectively movable horizontally towards or away from said lower support assembly to vary the free portion of the cane supporting members which extend beyond said cane billet abutting face remote from said lower supporting assembly, said free portion being adapted to pass vertically through a bed of prealigned cane billets to collect a cane billet thereon and convey it to said guide chute.

3,976,215

EASY-OPEN, TAMPER-INDICATING CLOSURE

Ned J. Smalley, Perrysburg, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Mar. 21, 1975, Ser. No. 560,708

Int. Cl.² B65D *41/32*

U.S. Cl. 215—253 **1 Claim**

1. A tamper-indicating press-on, pull-off closure for maintaining pressure in a container, said container including a neck portion with a sealing bead thereon and an open mouth at the upper extremity thereof, said closure comprising:

a plastic inner cap having a top wall spanning the open mouth of said container and a depending circumferential skirt surrounding and engaging the neck portion of said container;

a ring pull member formed integral with said inner cap, said ring pull being connected to and depending downwardly from the lower free edge of the circumferential skirt of

said inner cap by means of a hinge and at least one severable, tamper-indicating web which severs upon actuation of said ring pull member to remove said inner cap from engagement with said container neck;

an outer metal cap adapted to snugly fit over said inner cap and having a top wall overlying the top wall of said inner cap and spanning the open mouth of said container and a depending circumferential skirt surrounding the de-

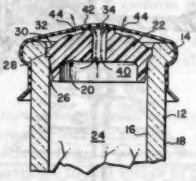
pending circumferential skirt of said inner cap and being crimped into holding engagement with the sealing band on said container neck to thereby retain said inner and outer caps in sealing engagement with said container neck to maintain pressure within said container, and said outer cap including at least one score in its skirt which fractures upon actuation of the ring pull member to thereby release the outer cap from engagement with the container neck.

3,976,216

STERILE BOTTLE CLOSURE

Jack R. Lambert, Lexington, Mass., assignor to Thermo Electron Corporation, Waltham, Mass.

Filed Dec. 26, 1974, Ser. No. 536,560
Int. Cl.² B65D 51/16
U.S. Cl. 215—307 **6 Claims**



1. A closure for a container adapted to hold sterile fluids said container including a neck formed with inner and outer walls, said neck having a rim at its upper and open end, said closure comprising:

a rigid plug adapted to fit down into the upper portion of the neck of the container, said plug having a body sized to fit within the inner wall of the container neck, venting means for communicating with the inside of the container and the ambient air and a central portion for extending above the plane of the container rim outward from said container neck, and

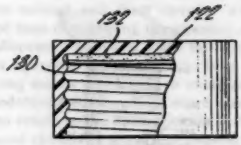
an elastic, fluid impervious cap adapted to fit over the open end of the container neck and down on the rim with its peripheral extremity engaging the outer wall of the container neck below the rim, said cap applying to the central portion of the plug an inwardly directed force and sealingly covering the venting means, the cap being provided with ventilating means out of registry with the venting means and adapted to be fluidly connected to the venting means, whereby when the pressure within the container exceeds the ambient pressure, the elastic cap will flex upwardly and allow pressurized fluid in the container to pass through the venting means and out the ventilating means in the cap and whereby, upon reduction of pressure within the container, the cap engages the rigid plug and container neck to seal as aforedescribed.

3,976,217

CAP LINER CONSTRUCTION

Joseph Dukess, 517 Fayette Ave., Mamaroneck, N.Y. 10543

Division of Ser. No. 482,417, June 24, 1974, Pat. No. 3,917,100. This application June 23, 1975, Ser. No. 589,257
Int. Cl.² B65D 53/04
U.S. Cl. 215—329 **5 Claims**



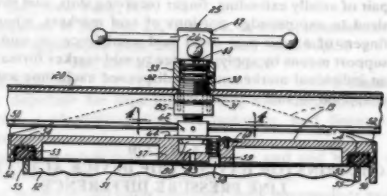
1. A closure device comprising a cap having a top and an internally threaded cylindrical side wall, said side wall having a groove therein adjacent said top, a liner disposed in said groove and including a disc having one outer layer and an intermediate layer bonded to said outer layer, said liner being bonded to said top, said outer layer being relatively thin and non-resilient, said intermediate layer being resilient and being compressible to form a lip extending beyond the periphery of said outer layer and into engagement with said side wall in said groove for forming a seal, said intermediate layer being relatively thick.

3,976,218

SAFETY APPARATUS FOR A PRESSURE COOKER

William F. Stoermer, Centerville, Ohio, assignor to Henny Penny Corporation, Eaton, Ohio

Filed Aug. 11, 1975, Ser. No. 603,673
Int. Cl.² B65D 45/00; A47J 37/12
U.S. Cl. 220—316 **8 Claims**



1. In pressure cooking apparatus having a receptacle, a lid adapted to be mounted on the receptacle, a bar extending across the lid and connectable to the receptacle to secure the lid to the receptacle and a spindle threaded in said bar and engageable with said lid to force said lid tightly against said receptacle, the improvement comprising,

a pressure operated interlock between said lid and said spindle to block rotation of said spindle in a lid-opening direction when the pressure within said receptacle exceeds a predetermined amount, said interlock comprising,

a pin slidably mounted in said lid,

a diaphragm liner on the inside of said lid supporting said pin,

a lock collar on said spindle having at least one hole engageable by said pin when said diaphragm, under pressure within said receptacle, forces said pin toward said collar.

3,976,219

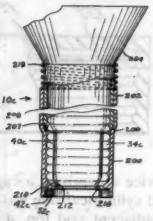
ARTICLE STORING AND DISPENSING UNIT

Russell W. Pagnoni, 1306 N. 24th St., Melrose Park, Ill. 60160

Filed Apr. 28, 1975, Ser. No. 572,346

Int. Cl.² G07D *1/00;* **B65D** *83/12*

U.S. Cl. 221—310 **11 Claims**



1. An apparatus adapted to receive, orient, and store a plurality of visible markers and to dispense said markers individually in a predetermined location under the control of a user, said apparatus comprising, in combination, an upper portion having an enlarged, marker-receiving open end and sidewalls extending downwardly therefrom, a body portion joined to said sidewalls of said upper portion, said body portion including means defining a marker inlet opening, a marker dispensing opening and a main body portion intermediate said openings, said body portion being adapted to store therein a plurality of said markers in stacked formation, means of reduced diameter disposed within said intermediate body portion, said reduced diameter means being adapted to engage and support the lowermost marker in said formation, said support means being adapted to deflect radially outwardly in response to an axial force to permit passage of a marker past said support means and through said discharge opening, said main body portion including wall surfaces having therein a pair of axially extending, finger receiving slots, said slots being sized to expose edge portions of said markers, whereby the fingers of a user may exert said axial force on said marker support means by applying force to said marker formation and an individual marker may be dispensed each time axial force is applied to said support means.

3,976,220

CHLORINATOR HAVING TRIP DEVICE ACTUATED BY LINE PRESSURE DIFFERENCE

Hendrik de Kanter, Santa Ana, Calif., assignor to GRW & Associates, Inc., Tustin, Calif.

Filed July 24, 1975, Ser. No. 598,683

Int. Cl.² B67D *5/08, 5/38*

U.S. Cl. 222—57 **17 Claims**

1. In a chemical feeder mechanism for a body of fluid:

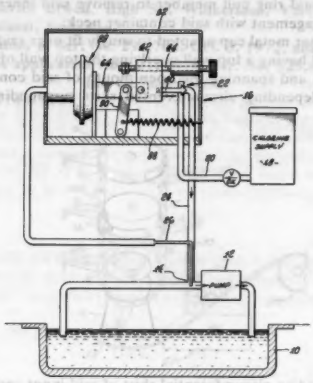
a. a valve for controlling communication between a chemical solution and another body of fluid;

b. a trip device having one part connected to said valve and having a second part;

c. motor means connected to said second part for slowly moving said second part in a direction to open said valve when said trip device is coupled;

d. means operable upon predetermined movement of said one part for tripping said trip device whereby said valve is free to move to closed position;

e. means for moving said valve to closed position following tripping of said trip device; and



f. said trip device being reset upon return movement of said second trip device part.

3,976,221

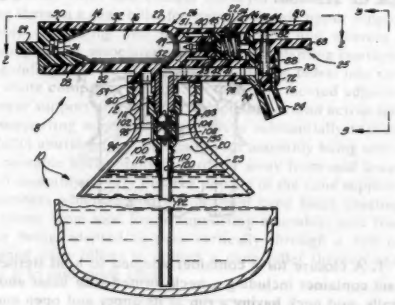
CARBONATOR AND DISPENSER FOR CARBONATED LIQUID OR THE LIKE

Richard E. Martin, Willoughby, and Anthony M. Gildone, Euclid, both of Ohio, assignors to GMF Inc., Cleveland, Ohio

Continuation-in-part of Ser. No. 484,122, June 28, 1974, Pat. No. 3,927,801. This application Sept. 11, 1975, Ser. No. 612,271

Int. Cl.² B67D *5/00;* **F15D** *1/02*

U.S. Cl. 222—61 **10 Claims**



1. In a carbonated liquid dispenser having means for defining a flow path for the carbonated liquid from a container thereof to an outlet opening, a valve means for selectively opening and closing the outlet and a foam inhibiting means in the flow path upstream from said valve means for defining a passage portion of varying cross section over a finite distance within the path for retarding foaming of the carbonated liquid over said flow path, said flow inhibiting means including means for reducing the flow area along the path from a first relatively large area to a second relatively small area, for increasing the flow area along the path from the second relatively small area to a third relatively large area, for reducing the flow area along the path from the third relatively large area to a fourth relatively small area, and for increasing the flow area along the path from the fourth relatively small area to a fifth relatively large area, the improvement wherein the finite distance of said flow path is defined by a member having

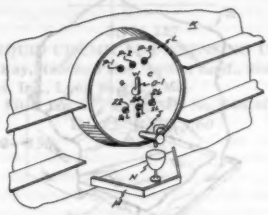
a chamber, said foam inhibiting means comprising first and second ball members of unequal diameter located in said chamber, chamber inlet means defining a seat for said first ball member and defining with said first ball member a passage therebetween for flow of fluid into said first relatively large area of said chamber, chamber outlet means defining a seat for said second ball member and defining with said second ball member a passage therebetween for flow of fluid from said fifth relatively large area of said chamber toward said valve, said first and second ball members being positioned in said seats to prevent both horizontal and vertical movement in said chamber while fluid flows therethrough.

3,976,222

BEVERAGE METERING AND DISPENSING DEVICE

Joseph Spagnolo, 11719 Cozumel, Cypress, Calif. 90630

Filed Jan. 28, 1974, Ser. No. 437,063
Int. Cl.² B67D *5/08*
U.S. Cl. 222—70 2 Claims



1. A device for selectively and automatically dispensing any one of a plurality of different beverages from a single spout and in any one of a plurality of different quantities thereof into a container when said device is manually actuated, said device including:

a. a plurality of tanks, with each of said tanks holding one of said beverages;

b. first means for maintaining a uniform pressure on said beverages in said tanks;

c. a plurality of normally closed, solenoid operated valves connected to said tanks, each of said valves including a liquid outlet;

d. a spout;

e. second means for connecting said outlets to said spout;

f. a source of alternating electric power;

g. a transformer that includes a primary and a secondary, said primary connected to said source of power, and said secondary supplying alternating current at a less voltage than that supplied to said primary from said source;

h. third means for transforming alternating electric current from said secondary to direct current;

i. a first normally closed electric circuit connected to said primary, said first circuit including a first rotating switch to permit alternating current from said primary to be selectively directed to a desired one of said solenoid operated valves to allow a particular one of said beverages to discharge from said spout when said first circuit is closed, and said first circuit further including a bidirectional triode thyristor that has first and second terminals that are connected in series in said first circuit and normally maintain said first circuit closed, with said thyristor including a gate that when voltage is applied thereto renders said thyristor conductive between said first and second terminals thereof;

j. a second normally closed electric circuit connected to said third means, said second circuit including a transistor that has the collector and emitter thereof connected in series in said second circuit, said collector connected to said gate of said thyristor, said transistor including a base, and said transistor until voltage of greater than a predetermined magnitude is applied to said base maintaining said second circuit in a closed condition;

k. a third normally closed circuit connected to said third means, said third circuit including a plurality of electrically operated timing means to maintain said third circuit closed for various lengths of time after one of said timing means has been momentarily electrically energized, and said third circuit connected to said base after one of said timing means has been energized;

l. fourth normally open electric circuit connected to said third means and said timing means, said fourth circuit including a plurality of normally open second electric switches that may be selectively closed to momentarily energize one of the timing means, with said third circuit thereafter being closed for a desired length of time as is said first second and third circuits, with said desired length of time determining the quantity of beverage that will be dispensed from said spout through the one of said solenoid operated valves that has been energized, and said timing means that has been energized at the end of said predetermined length of time causing said third circuit to return to the open position and break said first and second circuits to allow said solenoid operated valve that that had been electrically energized to return to a closed position;

m. a fifth circuit supplied with electric power from said transformer, said fifth circuit including a plurality of electrically operated lights one of which is at all times illuminated when said transformer is energized, said fifth circuit including a second rotary switch that moves concurrently with said first rotary switch to complete said fifth circuit to one of said lights;

n. insignia means adjacent said lights with one of said lights when illuminated adjacent one of said insignia visually indicating which of said beverages will be dispensed after one of said second switches is momentarily closed;

o. a plurality of electrically operated nonreset counters; and

p. sixth normally open electric circuit means connected to said primary and to said counters that is momentarily closed to actuate one of said counters when one of said second switches is closed.

3,976,223

AEROSOL PACKAGE

Herman E. Jass, Princeton, and Frederick F. Kohlhepp, Princeton Junction, both of N.J., assignors to Carter-Wallace, Inc., New York, N.Y.

Continuation of Ser. No. 22,729, Feb. 2, 1972, abandoned.
This application June 26, 1975, Ser. No. 590,553
Int. Cl.² B65D *35/22*, *35/28*
U.S. Cl. 222—94 3 Claims

1. A dispenser for separately storing and simultaneously dispensing a plurality of flowable materials, said dispenser comprising:

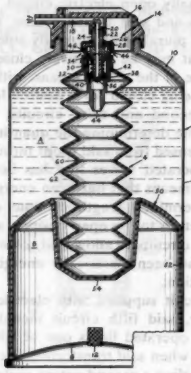
an outer container body closed at one end and having a dispensing valve means at its opposite end;

piston means in said outer container body intermediate said ends and defining in said container body an axially extending inner pressure tight upper chamber for a first flowable material, and an axially extending inner pressure tight lower chamber for a fluid material;

at least one collapsible inner container body for a second flowable material in said upper chamber co-axial therewith, said inner container having a diameter substantially less than the inside diameter of the outer container body and having walls which are transversely accordion pleated and being integrally closed at its end adjacent to the closed end of said outer container body and connected at its opposite end to said dispensing valve means;

said piston means in said outer container body being movable in said upper and lower chambers for dispensing flowable materials out of said upper chamber and said inner container body through said dispensing valve

means, said piston means comprising a piston having a skirt extending axially along the inner surface of the wall of said outer container body and having a recess in the face thereof which is toward said valve means in which recess the closed end of said inner container is seated for guiding said inner container body as it collapses as said



piston means moves from said closed end of said outer container body towards said dispensing valve means, said recess being sufficiently deep for accomodating a substantial portion of said inner container when collapsed to prevent misalignment of said inner container during its collapse, and constituting the sole means for guiding said container during its collapse.

3,976,224

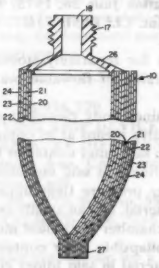
COLLAPSIBLE DISPENSING TUBES

Kenneth R. Ericson, and Ernest S. Smith, both of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Continuation of Ser. No. 216,500, Jan. 10, 1972, abandoned. This application Nov. 1, 1974, Ser. No. 520,088

Int. Cl.² B65D *35/08*

U.S. Cl. 222—107 **15 Claims**



1. A collapsible dispensing tube including a headpiece having a dispensing orifice therein and a body extending from said headpiece, said body comprising a single layer of a laminated material, said laminated material comprising an inner layer of polymer, a first layer of metallic foil annealed to a substantially deadsoft condition superposed thereon and bonded thereover, a second layer of polymer superposed on said first layer of metallic foil and bonded thereover, and a second layer of metallic foil annealed to a substantially deadsoft condition superposed over said second layer of polymer and bonded thereover, said laminated material being in tubular form and having the longitudinal edges thereof in contiguous relationship and sealed into a longitudinal seam.

3,976,225

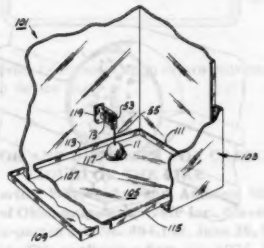
FLOOD CONTROL FOR BEVERAGE VENDOR

William V. Koeneker, St. Louis, Mo., assignor to UMC Industries, Inc., New York, N.Y.

Filed July 15, 1974, Ser. No. 488,479

Int. Cl.² B67D *1/16*

U.S. Cl. 222—108 **4 Claims**



1. A beverage vendor of the type comprising a cabinet, a water supply system including a line for bringing water into the cabinet and a valve in said line with the improvement of a flood control means in the cabinet, said flood control means comprising means for collecting water discharged from said system upon a failure, and means responsive to collection of flood water in said collecting means before it overflows for closing the valve to cut off the supply of water, wherein said collecting means comprises a sump at the bottom of the cabinet, wherein the cabinet has a bottom panel formed to provide said sump, wherein said sump is a recess in said bottom panel and wherein said means responsive to collection of flood water comprises a float adapted to float in the water collected in said recess and a switch operable by the float, whereby upon flood water collecting in said bottom panel, it fills said recess thereby causing the float to rise above a predetermined level at which said switch is actuated to close said valve.

3,976,226

INJECTION MOLDING NOZZLE FOR THREE SEPARATE MATERIALS

Bernard Leon Monnet, Bellignat, France, assignor to Billion S.A., Oyonnax, France

Filed Sept. 23, 1974, Ser. No. 508,567

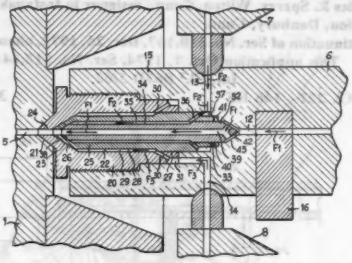
Claims priority, application France, Sept. 21, 1973, 73.34011

Int. Cl.² B29E *1/03*

U.S. Cl. 222—135 **10 Claims**

1. An injection nozzle for injecting at least three separate materials into a mold to form a multilayered article, said nozzle comprising a single discharge channel opening on the

side of the mold and comprising at least three coaxial chambers separated from each other, each chamber being con-



nected to an independent supply circuit for material to be injected and comprising a plastification unit.

3,976,227

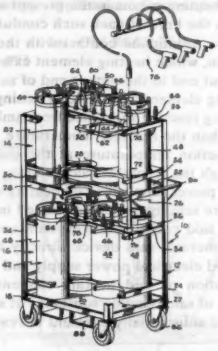
LIQUID CHEMICAL DISPENSING UNIT

Manuel C. Ray, Rancho Palos Verdes, Calif., assignor to ROK Industries, Inc., Long Beach, Calif.

Filed Jan. 27, 1975, Ser. No. 544,403

Int. Cl.[2] B67D *5/60*

U.S. Cl. 222—136 **4 Claims**



1. Apparatus for storing and dispensing a liquid chemical at a uniform spray rate comprising:

a cart having a frame structure comprising a rectangular base, the base including a rectangular lower tank support bed horizontally disposed and having a marginal lip extending upward from the bed;

four vertically extending L-shaped riser struts, each joined to a different corner of the base;

a first pair of bed support struts, the struts of the first pair being disposed parallel to one another, and the first pair defining a plane normal to the L-shaped riser struts, and a second pair of bed support struts disposed normal to and in the plane of the first pair of bed support struts, the first and second pairs of bed support struts being joined to the riser struts;

a planar rectangular upper bed for supporting a plurality of tanks, the bed having edge portions disposed on the first and second pairs of bed support struts;

upper and lower longitudinal panel supports disposed horizontally in a parallel spaced-apart relationship above the upper and lower beds, respectively;

upper and lower apertured rectangular guide panels having a plurality of tank guiding openings therein for maintaining a plurality of tanks in a spaced-apart relationship and in an upright position, the panels being positioned horizontally and having edge portions disposed on the upper and lower panel supports;

an upper set of cylindrical tanks disposed upright on the upper bed and within the openings of the upper panel, and a lower set of cylindrical tanks disposed upright on the lower tank support bed and within the openings of the lower panel, each of the upper and lower tanks being of the type having a cylindrical liquid support chamber, an upper portion, a gas-impervious inlet fitting on the upper portion including a short tube extending partly into the chamber, an outlet fitting including a siphon tube extending substantially into the chamber for communicating a fluid from the bottom of the chamber to the fitting, a liquid loading opening within the upper portion of the tank, and a gas-tight locking unit for sealing the opening following the loading of a liquid chemical into the tank;

a gas manifold comprising a pipe having two closed ends, a plurality of hose fittings and a pressure receiving fitting;

a liquid manifold comprising a pipe having a closed end and a plurality of hose fittings along the length thereof and a liquid outlet fitting opposite the closed end;

a plurality of pressure communicating hose elements coupling the hose fittings of the gas manifold to the inlet fittings of the upper tanks;

a plurality of fluid communicating hose elements coupling the outlet fittings of the upper tanks to the inlet fittings of the lower tanks; and

a plurality of liquid communicating hose elements coupling the outlet fittings of the lower tanks to the inlet fittings of the liquid manifold;

the fluid dispensing system thereby providing a plurality of serially connected upper and lower tank pairs, the pairs being connected in parallel between the liquid and gas manifolds to provide a simultaneously depletable liquid chemical at an outlet of the manifold at a high available flow rate.

3,976,228

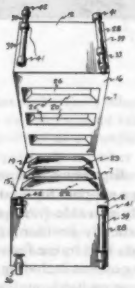
LIQUID STORAGE SYSTEM

Allen Blaine Robbins, 4615 Macky Way, Boulder, Colo. 80303

Filed Dec. 5, 1974, Ser. No. 529,870

Int. Cl.[2] B65D *21/00*; B67D *5/60*

U.S. Cl. 222—143 **7 Claims**



1. A liquid container, comprising: substantially flat first and second walls one of which has a plurality of protuberances therein of predetermined configurations and the other of which has a like plurality of indentations therein with configurations complementary to that of said protuberances so that identical containers placed in abutting relationship have said first and second walls contiguous to one another with said

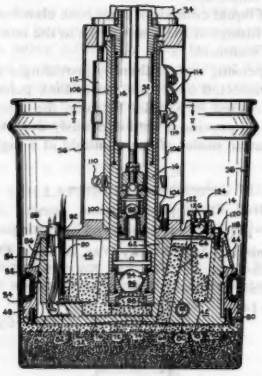
protuberances mating with and being tightly received in said indentations; a plurality of walls joining said first and second walls to form a closed container suitable for storing liquids; and conduit means opening into one of said plurality of walls for supplying liquid to said container and withdrawing liquid therefrom, said conduit means being adapted to connect with conduit means in abutting like containers to thereby interconnect said containers, and said conduit means including a lower conduit means opening into the bottom portion of said container for handling liquids withdrawn therefrom and upper conduit means opening into the top portion of said container to allow ingress of air into said container as liquid is withdrawn therefrom.

3,976,229

HOT MELT DISPENSING APPARATUS

Jordan S. Jackson, Northville, Mich., assignor to Pyles Industries, Inc., Wixom, Mich.

Filed Mar. 31, 1975, Ser. No. 563,671
Int. Cl.² B67D 5/62
U.S. Cl. 222—146 HE 14 Claims



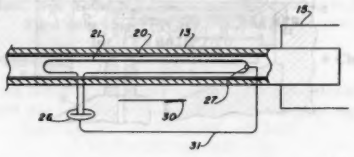
1. Apparatus for dispensing heat meltable material from a container including a support for a container of heat meltable material, a vertically movable frame mounted upon said support, means for vertically positioning said frame, dispensing means mounted upon said frame for vertical movement therewith, said dispensing means including a head adapted to enter said container of heat meltable material for engagement with the upper surface thereof, said head including a lower surface engaging the material upper surface, heating means heating said head to melt the heat meltable material adjacent said lower surface, a reservoir inlet defined in said head lower surface, vertically extending wall surfaces and a lower surface defined on said head defining a reservoir for receiving and holding melted material within said head, said inlet communicating with said reservoir, and a pump connected to said head having a pump inlet communicating with said reservoir.

3,976,230

SYSTEM FOR DISPENSING POLYURETHANE AND THE LIKE

Charles R. Sperry, Wilton, Conn., assignor to Instapak Corporation, Danbury, Conn.

Continuation of Ser. No. 318,167, Dec. 26, 1972, abandoned.
This application Oct. 7, 1974, Ser. No. 512,441
Int. Cl.² B67D 5/62
U.S. Cl. 222—146 HE 3 Claims



1. In a system for dispensing a reactive mixture of at least two reacting substances such as polyurethane precurser chemicals wherein said substances are required to be heated above ambient temperature to cause proper and timely reaction thereof and which system includes receptacles for said reacting substances, conduits therefor and a common dispensing means at the output end of said conduits, the improvements comprising:

a. a conduit member for each such reacting substance extending from the receptacle thereof to said common dispensing means for the reaction mixture;

b. an electrically conducting wire heating element, comprising the sole heating means in the present system, loosely positioned in the bore of each such conduit member and adapted to be in intimate contact with the reacting substance therein, which heating element extends essentially from the input end to the output end of said conduit and which heating element is capable of raising the temperature of flowing reacting substance from ambient temperature, lower than the reacting temperature, to proper and constant reaction temperature at the output end as it passes through the length of said conduit;

c. an electrical power supply for said heating element; and

d. a temperature sensing device positioned in the bore of at least one of said conduits downstream and adjacent the output end thereof, said device directly controlling the output of said electrical power supply and thus indirectly the energization of said heating element whereby the temperature of said reacting substance at said output end is maintained substantially constant at reaction temperature.

3,976,231

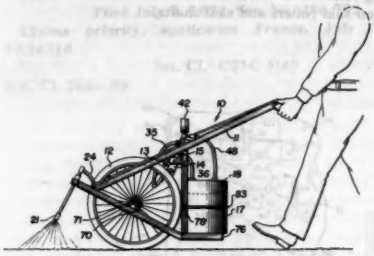
HAND-PROPELLED CHEMICAL APPLICATOR

Gilbert E. Betulius, Evansville, Ind., assignor to Chem-Farm Inc., Evansville, Ind.

Filed Oct. 10, 1974, Ser. No. 513,731
Int. Cl.² A01C 15/00; B05B 9/06
U.S. Cl. 222—177 3 Claims

1. A fluid dispensing apparatus comprising a manually propelled vehicle including a frame and a ground engaging wheel supporting said frame, a reservoir for containing a quantity of fluid to be dispensed mounted on said frame, pump means having an inlet communicating with a lower portion of said reservoir and an outlet, said pump having a capacity for delivering fluid in excess of the amount of fluid to be dispensed, dispensing nozzle means in communication with said outlet of said pump means for distributing the fluid while the vehicle is being propelled over an area to be treated, recirculating means in fluid communication with said outlet of said pump means for delivering excess fluid which is not dispensed back to said lower portion of said reservoir for mixing with the fluid remaining in said reservoir, a member shiftably mounted on

said frame for movement between forward and retracted positions, said pump means being mounted on said member and including a drive wheel engageable with and frictionally



driven directly by said ground wheel when said member is in said forward position, said drive wheel being disengaged from said ground wheel when said member is in said retracted position.

3,976,232

DEVICE FOR EMPTYING SILOS FOR BULK MATERIAL, PROVIDED WITH A FLAT OR SLIGHTLY INCLINED BOTTOM

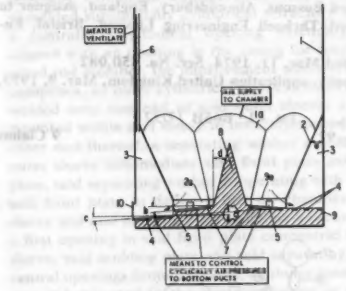
Reinhard H. H. Heidebroek, Hamburg, Germany, assignor to Claudius Peters AG, Hamburg, Germany

Filed July 22, 1974, Ser. No. 490,367

Claims priority, application Germany, July 20, 1973, 2336984

Int. Cl.² B65G 3/14

U.S. Cl. 222—193 **13 Claims**



1. A silo for fluid bulk material comprising:

a vertical silo housing;

an inner compartment within the said housing adjacent to its bottom, open at the top toward the upper part of the said silo and merging there with the vertical walls thereof;

the walls of the said compartment sloping from the top thereof as slope-walls toward the bottom of the silo and ending in an annular vertical wall extending to the bottom of said silo;

the slope walls of said compartment with the said vertical wall defining together with the bottom section of the walls of said silo an annular channel;

a plurality of material release openings in said vertical wall into said channel;

at least one material discharge opening from the said channel in the bottom portion of said silo to the outside;

open airducts in the bottom of said compartment leading to the individual material release openings with means to supply air to them; and

open airducts in the bottom of said channel with means to supply air through them.

3,976,233

WRIST-WATCH BRACELET

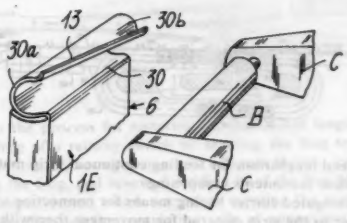
Mario Cobelli, Milan, Italy, assignor to Multibrev Anstalt, Vaduz, Liechtenstein

Filed June 27, 1975, Ser. No. 590,963

Claims priority, application Italy, July 12, 1974, 25157/74; July 19, 1974, 25371/74

Int. Cl.² F16G 13/18

U.S. Cl. 224—4 E **10 Claims**



7. A bracelet, particularly for wrist-watches, comprising a plurality of interarticulated links, wherein the end links have means for connection to the wrist-watch body or case, such means comprising an edge extending from the link body which is rolled up according to an open cylinder, the latter not necessarily being of circle arc cross-section, the arc lengths for the various right sections decreasing from one to the other end of the cylinder.

3,976,234

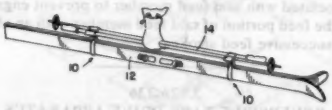
PORTABLE SKI AND SKI POLE CARRYING APPARATUS

George M. Moudry; Nancy Lee Moudry, both of Naperville; Nicholas F. Casiello, Lisle, and Anthony V. Marino, Lombard, all of Ill., assignors to Amphora Enterprises Inc., Lisle, Ill.

Filed Sept. 23, 1974, Ser. No. 508,460

Int. Cl.² B65D 71/00

U.S. Cl. 224—45 S **12 Claims**



1. A portable apparatus particularly adapted for hand carrying skis and ski poles in parallel spaced relationship such that said ski poles may be utilized as a handle to carry said skis, including a relatively rigid body member having a generally flat stem portion and a pole holding clip portion, said pole holding clip portion having a pair of adjacent, resilient ski pole receiving and holding clips disposed near one end of said body member whereby each of said clips is adapted to separately receive and hold a ski pole, said pair of clips maintaining said pair of ski poles in parallel relationship, and an elongated elastic means, said elastic means having one end thereof mounted on said stem portion of said body member, an opposite end of said elastic means being free to allow said elastic means to be looped and stretched around a pair of skis placed in parallel relationship, and generally on opposite sides of said stem portion of said body member, said opposite end of said elastic means having latching means for engaging said body member, said body member having corresponding locking means formed therein for receiving said latching means for engaging said body member to allow said elastic means to be

tightly stretched around said skis and securely fastened to said body member under tension to hold said skis adjacent one another and said body member.

3,976,235

STOP FEED MECHANISM

Joseph W. Baldyga, Mount Clemens, and Thomas M. Cairns, Birmingham, both of Mich., assignors to Diamond Die & Mold Co., Mount Clemens, Mich.

Filed Mar. 28, 1975, Ser. No. 563,189

Int. Cl.² B65H *25/00*

U.S. Cl. 226—11 **10 Claims**

1. Feed mechanism for feeding continuous strip material in successive increments comprising

an elongated carrier having means for connecting said carrier to the strip material for movement therewith,

a series of uniformly spaced feed abutments provided by said elongated carrier,

a feed member,

means for moving said feed member in alternate feed and return strokes along said series of abutments,

said member having a feed portion movable in a direction transverse to its direction of movement in said feed and return strokes relative to said series of abutments,

resilient means urging the feed portion of said member toward said series of abutments,

the feed portion of said feed member having a cam surface thereon engageable with one of said abutments during the return stroke of said member shaped to cam the feed portion of said member to pass over said one abutment,

said feed portion having a feed surface engageable with said one abutment on the successive feed stroke of said member to move said one abutment and hence the strip material forwardly a distance equal to the spacing between said abutments during the feed stroke of said member,

and feed control means responsive to the movement of the trailing end of said strip material therebeyond operatively associated with said feed member to prevent engagement of the feed portion of said feed member with an abutment on successive feed strokes.

3,976,236

REVERSIBLE TAPE DRIVE APPARATUS

Kenneth A. Catto, Beaverton, Oreg., assignor to Telephonax, Inc., Portland, Oreg.

Filed Apr. 4, 1975, Ser. No. 565,104

Int. Cl.² B65H *17/22*

U.S. Cl. 226—50 **10 Claims**

1. Apparatus for selectively driving a magnetic tape, or the like, in reverse directions comprising

a deck,

a drive motor mounted on said deck,

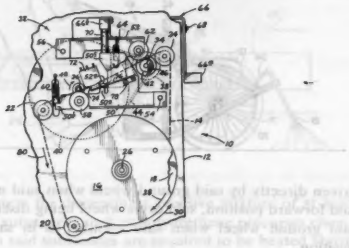
a pair of spaced-apart shafts mounted for rotation, and drivingly connected to said motor for simultaneous rotation in a common direction with operation of the motor,

guide means for guiding a stretch of tape for travel adjacent and between said shafts,

a pair of movable pinch rollers, one for each shaft, positioned adjacent the same for pinching tape against the shaft, said rollers being shiftable relative both to said shafts and to each other, and

shifting mechanism operatively connected to said rollers, operable to shift said rollers to one condition where one engages one shaft, with the other then disengaged from the other shaft, and to another condition where said other roller engages said other shaft, with said one roller then disengaged from said one shaft,

adjustment of said mechanism between said conditions causing relative movement between said rollers, as well as between said rollers and said shafts,



said shifting mechanism including a pivoted carrier for each pinch roller pivoted on said deck with said carriers normally disengagably touching each other, and a biasing spring operatively interconnecting said deck and one of said carriers, said biasing spring urging said one carrier toward the other carrier, and thereby urging said shifting mechanism toward its said one condition.

3,976,237

WEB GUIDE SYSTEMS

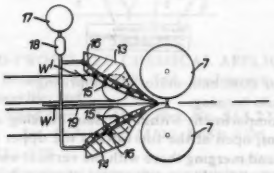
Walter Howard Bossons, Almondsbury, England, assignor to Masson Scott Thrissell Engineering Limited, Bristol, England

Filed Mar. 11, 1974, Ser. No. 450,082

Claims priority, application United Kingdom, Mar. 9, 1973, 11557/73

Int. Cl.² B65H *17/32*

U.S. Cl. 226—97 **9 Claims**



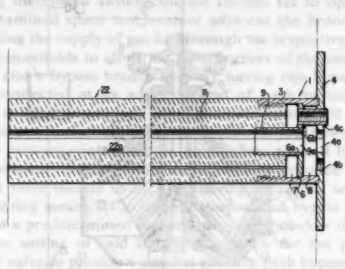
1. In a paper or paperboard cutting machine, means for guiding the leading end of at least one web of paper or paperboard into the cutting zone, the guiding means comprising an opposed set of fluid entrainment devices, each set consisting of a plurality of air jet members spaced apart across the width of the intended web path and the air jets being directed towards said path and into the cutting zone, and conveyor bands whose delivery ends alternate with and overlap the air jet members.

3,976,238

AIR-COOLED REFRACTORY GUIDE TUBE FOR A METALLURGICAL FURNACE

Guy Sartorius, Ban-Saint-Martin, France, assignor to Societe des Aciers Fins de l'Est, Boulogne-Billancourt, France

Filed July 9, 1974, Ser. No. 486,792
Claims priority, application France, July 17, 1973, 73.26218
Int. Cl.² C21C 5/46
U.S. Cl. 266—99 4 Claims



1. In a guide tube assembly to be mounted in the wall of a metallurgical furnace for guiding an elongated rod member in intermittent penetrating movement into the cavity of the furnace for continuous measurement of the temperature of the wall, said guide tube assembly including a metal case of generally cylindrical configuration adapted to support an elongated substantially cylindrical refractory member having a centrally longitudinal opening extending therethrough aligned with an opening in the casing for receiving the elongated rod member, the improvement wherein said metal case comprises, an outer cylindrical sleeve, a front mounting plate welded onto one end of said outer sleeve, a molding plate mounted within said sleeve in inwardly-spaced relation to the other end thereof, a separating washer mounted within said outer sleeve intermediate said front plate and said molding plate, said separating washer cooperating with said sleeve and said front plate to define a first air chamber and with said sleeve and said molding plate to define a second air chamber, a first opening in said front plate concentric with said outer sleeve, said molding plate and said separating washer having central openings formed therein, a tubular guide sleeve having one end mounted in the central opening in said separating washer and projecting through the central opening in said molding plate, said guide sleeve being axially aligned with and having an inner diameter at least slightly greater than the diameter of said first opening in said front plate, said outer cylindrical sleeve, said molding plate, and said guide sleeve cooperating to define an annular recess for receiving and supporting one end of said refractory member with the central longitudinal opening therein in axial alignment with said guide sleeve and with the central opening in said front plate, first means for supplying air under pressure to said first air chamber and second means for supplying air under pressure to said second air chamber, a plurality of circumferentially spaced openings formed in said molding plate in outwardly spaced relation to said central opening therein, and a plurality of circumferentially spaced axially extending openings in said refractory member cooperating with said openings in said molding plate for permitting the flow of air from said second air chamber through said refractory support outwardly of said central longitudinal opening.

3,976,239

PROCESS FOR RECONDITIONING WORN FROGS

Herbert Finck, Witten-Bommern, Germany, assignor to Elektro-Thermit GmbH, Germany

Continuation of Ser. No. 475,966, June 3, 1974, abandoned.
This application Aug. 12, 1975, Ser. No. 603,972
Claims priority, application Germany, June 27, 1973, 2332646
Int. Cl.² B22D 19/10
U.S. Cl. 228—119 3 Claims

1. In the process for restoring the prescribed length of a worn frog of a railway switch by severing the frog together with sections of the regulating rails adjacent thereto, reconditioning the frog, and renewed welding-in of the frog block,

the improvement which comprises severing the worn frog from the junction regulating rails at connecting welds thereof,

reconditioning the frog,

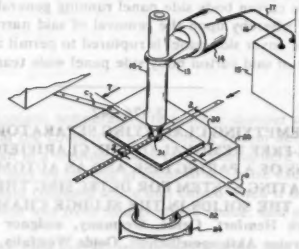
and welding two new regulating rails onto the reconditioned frog, with compensation for the loss in length, due to the severing operation, simultaneously in one casting by aluminothermic welding.

3,976,240

APPARATUS FOR APPLYING CONTACTS

Robert Michael Matrisian, New Cumberland, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 404,791, Oct. 9, 1973, Pat. No. 3,926,357.
This application June 23, 1975, Ser. No. 589,542
Int. Cl.² B23K 1/20
U.S. Cl. 228—5.1 3 Claims



1. An apparatus for attaching a foil element to a member comprising,

a plate floatingly disposed in a welding zone for receiving a foil element and a member on opposite sides of the plate, said plate having an opening therein for superposing an interior portion of the foil element with the member,

means for welding a selected portion of the foil element to the member in said welding zone through the opening in said plate, and

means for advancing the foil element and the member from the welding zone thereby stripping the unwelded portion of the foil element against the opening in said plate to leave the welded portion attached to the member.

3,976,241

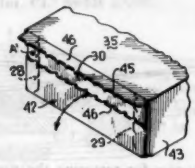
METHOD OF FORMING, FILLING AND CLOSING CARTONS, AND SPECIFIC CARTONS THEREFOR

Robert P. Bemiss, 925 Vista Road, Hillsborough, Calif. 94010

Continuation-in-part of Ser. No. 453,087, March 20, 1974, Pat. No. 3,927,505, which is a division of Ser. No. 347,411, April 3, 1973, Pat. No. 3,812,641. This application Aug. 21, 1975, Ser. No. 606,458

Int. Cl.² B05D 5/54

U.S. Cl. 229—51 TS 8 Claims



1. A package consisting solely of a cover, a carton body, and an edible product in said carton body, said carton body being defined by a bottom panel and four upstanding side panels generally normal thereto, a gusset panel between adjacent side panels of said carton body, said gusset panel being defined by a pair of panel portions overfolded into contiguous relationship to each other, adhesive means bonding said gusset panels and side panels to maintain a generally polygonal configuration to said four upstanding side panels as viewed in top plan, each of said side panels terminating in a free terminal edge, said cover including a top panel and four side panels joined thereto along associated fold lines, said cover being disposed upon said carton body with the fold lines thereof contiguous said free terminal edges, said cover and carton body side panels being directly bonded to each other, cooperative means between one of said carton body side panels and an overlying one of said cover side panels for rupturing both of the latter to provide an access opening for the removal of the edible product, said cooperative means including a narrow tear strip in said one cover side panel running generally the length thereof between end edges of said one cover panel, and said cooperative means further including a wide tear strip in said one carton body side panel running generally the height thereof whereby upon the removal of said narrow tear strip said one cover side panel is ruptured to permit access to and rupture of said carton body side panel wide tear strip.

3,976,242

SELF-EMPTYING CLARIFYING SEPARATOR HAVING A FOAM-FREE REMOVAL OF THE CLARIFIED LIQUID BY MEANS OF A PARING DISK AND AN AUTOMATICALLY OPERATING SYSTEM FOR DETECTING THE LEVEL OF THE SOLIDS IN THE SLUDGE CHAMBER

Heinrich Hemfort, Oelde, Germany, assignor to Westfalia Separator Aktiengesellschaft, Oelde Westfalia, Germany

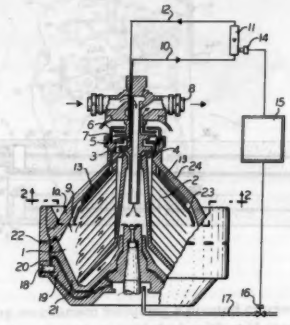
Filed July 14, 1975, Ser. No. 595,928

Claims priority, application Germany, July 27, 1974, 2436285

Int. Cl.² B04B 11/04

U.S. Cl. 233—20 R 2 Claims

1. In a centrifuge having a self-emptying clarifying drum having a separating plate disposed adjacent the drum cover, and a clarified liquid paring chamber and clarified liquid paring disc mounted in the clarified liquid paring chamber for foam-free removal of the clarified liquid, and control means including detecting means for detecting the level of solids in the outer portion of the drum which serves as a sludge chamber, and response means operatively connected to the detecting means and operative upon actuation thereof by the detecting means to effect emptying of sludge from the sludge chamber, said detecting means comprising an auxiliary paring chamber formed as part of the drum, a control liquid passageway leading from the sludge chamber to the auxiliary paring chamber, first and second auxiliary paring discs which are of different diameter, the first of which is disposed in the auxiliary paring chamber and the second of which is disposed in the clarified liquid paring chamber, an auxiliary passageway communicating the first and second auxiliary paring discs and having a monitoring means mounted therein which is responsive to change in flow through the auxiliary passageway in dependence on sludge accumulation in the sludge chamber and effective to actuate the response means, the improvement



which comprises the first auxiliary paring disc disposed in the auxiliary paring chamber having a larger diameter than the second auxiliary paring disc disposed in the clarified liquid paring chamber for flow of control liquid from the auxiliary paring chamber and through the auxiliary passageway to the clarified liquid paring chamber, the control liquid passageway connecting the sludge chamber with the auxiliary paring chamber being constructed substantially as an annular passage which is defined by said separating plate and the drum cover, and a plurality of superimposed insert plates disposed in the annular passage.

3,976,243

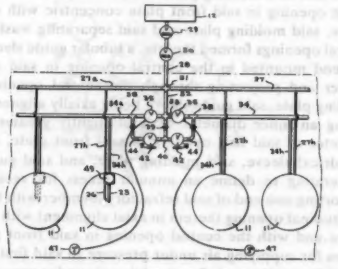
GAS FUEL CONTROL SYSTEM FOR MULTIPLE BROODER INSTALLATIONS

Reuben L. Christophel, Harrisonburg, Va., assignor to Shenandoah Manufacturing Co. Inc., Harrisonburg, Va.

Filed June 10, 1975, Ser. No. 585,716

Int. Cl.² A01K 31/20

U.S. Cl. 236—6 10 Claims



8. A gas fuel supply control system for regulating the supply of gas fuel to a plurality of gas fired poultry brooders arranged in first and second series of plural brooders alined in a single row, each brooder having a gas fired main burner to effect heating of the space served by that brooder and a gas fired pilot burner and individual burner and pilot inlet pipes for each brooder, a main supply conduit to be coupled to a source

of gas fuel, a pair of pilot branch manifolds forming supply manifolds for each representative series connected to said main supply conduit substantially midway of said row of brooders and connected to the pilot inlet pipes for each brooder of the associated series, a pair of main burner branch manifolds forming supply manifolds for each respective series connected to the individual burner inlet pipes of the associated series and each having a feed end connected at a feed connection to the main supply conduit, an electrically activated temperature controlled primary control valve for each burner branch manifold interposed in the associated burner branch manifold adjacent the feed end thereof, operated responsive to electrical signals from an adjustable temperature sensing thermostat switch coupled thereto set to open at a predetermined space temperature adjacent the brooders for regulating the supply of gas fuel through the respective burner branch manifolds to all of the main burners of the associated series, and a bypass branch network having two bypass conduits connected at an adjoining end of each to said main supply conduit at said feed connection and connected respectively to said main burner branch manifolds just downstream of said primary control valves, each bypass conduit having a non-electrical self-operating temperature controlled bypass control valve therein of the type having adjustable temperature sensing means set to open the associated bypass control valve at a predetermined temperature slightly below the temperature setting of said thermostat switch for the primary control valve to provide a parallel gas flow path bypassing the latter for automatically taking over temperature responsive regulation of the gas supply to the main burners of the brooders in the associated series during periods of electrical power failure disabling said electrically activated temperature controlled primary control valves.

3,976,244

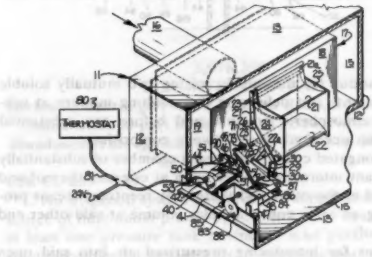
ADJUSTABLE AIR VOLUME REGULATOR HAVING THERMAL MOTOR ACTUATOR FOR EFFECTING ADJUSTMENT

Hillard Glenn Logsdon, Charlotte, N.C., assignor to Aeronca, Inc., Pineville, N.C.

Continuation-in-part of Ser. No. 491,696, July 25, 1974. This application Sept. 3, 1974, Ser. No. 502,404

Int. Cl.² F24F *11/02*

U.S. Cl. 236—49 **11 Claims**



1. Apparatus for adjustably controlling the flow of air in an air conditioning system and comprising a regulator having flow control means movable in response to fluctuations in the pressure of the air supplied to the regulator so as to variably restrict the flow of air through the regulator for thereby maintaining the flow of air passing through the regulator at a substantially constant rate, flow adjustment means cooperating with said flow control means for permitting varying the flow rate maintained by the flow control means and including means mounted for movement with respect to said flow control means and cooperating therewith for permitting varying the flow rate through the regulator from a maximum flow rate to a fully closed condition and through a infinite number of different flow rates therebetween, and actuator means cooperating with said flow adjustment means for effecting adjustment of the flow rate through the regulator and comprising a thermal motor having an axially movable shaft extending therefrom, heating means cooperating with said thermal motor for applying heat thereto to effect an axial movement to said motor shaft, and means cooperating with said thermal motor and operatively connecting the same to said flow adjustment means for effecting adjustment of the rate of flow through the regulator in response to the axial movement of said motor shaft.

3,976,245

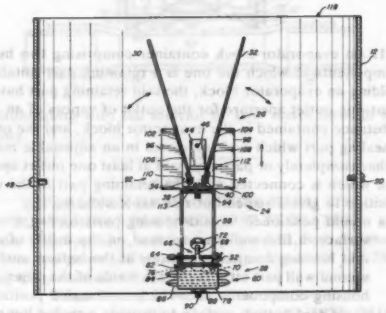
AUTOMATIC, TEMPERATURE RESPONSIVE DAMPER ASSEMBLY

James D. Cole, 6403 Shoalcreek West, Austin, Tex. 78731

Continuation-in-part of Ser. No. 482,699, June 24, 1974, Pat. No. 3,921,900. This application Nov. 24, 1975, Ser. No. 634,358

Int. Cl.² G05D *23/02*

U.S. Cl. 236—93 A **6 Claims**



1. An automatic temperature responsive damper assembly for use within the conduit of a ventilating system designed to exhaust the air in a confined space to the atmosphere whereby said conduit may be opened in order to minimize excess heat build up in said confined space and closed when it is desired to prevent heat loss from said confined space, said assembly comprising:

at least one vane carried within said conduit and movable between a generally closed position and a generally open position;

a temperature responsive drive assembly mounted to detect temperature changes in said conduit and adapted to actuate in response to temperature changes within a predetermined range;

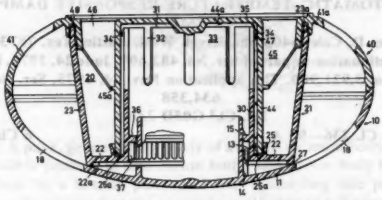
a lever arm positioned in said conduit and operatively connected between said drive assembly and said at least one vane to move said at least one vane in response to actuation of said drive assembly;

said lever arm being provided at its distal end with a vane engageable finger having a camming surface for each vane, said camming surface adapted so as to move said at least one vane between its open and closed positions in response to actuation of said drive assembly and to permit slideable contact with said vane.

3,976,246
EVAPORATOR-BLOCK CONTAINER WITH ADJUSTABLE CROSS SECTION OF OUTLET APERTURE

Rene Hauri, Frenkendorf, and Raphael Charles Misslin, Basel, both of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland

Filed May 8, 1975, Ser. No. 575,680
Claims priority, application Switzerland, May 15, 1974, 6646/74
Int. Cl.² A24F *25/00*
U.S. Cl. 239—57 **8 Claims**



1. An evaporator-block container comprising two housing components of which the one is a retaining part suitable for holding an evaporator block, the said retaining part having at least one outlet aperture for the outlet of vapors of an active substance contained in the evaporator block, and the other is a sealing part which seals or closes in an adjustable manner, either completely or partially, said at least one outlet aperture and which is connected with the retaining part in the closed position to give a sealed but releasable closure;

a mould positioned in said housing parts having a bottom surface, a first wall part secured on the inside of one of said housing components on or at the bottom surface, a second wall part attached to the inside of the other of said housing components and which in a sealed position engages said bottom surface to provide a sealed but releasable closure, and an inlet aperture facing said other of said housing components for receiving molten evaporator-block material; and

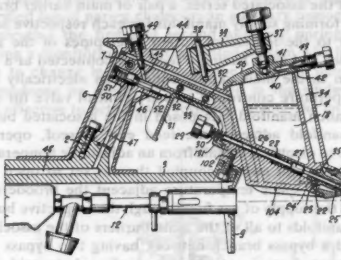
adjusting means positioned on said housing components for sealingly engaging said components so as to completely seal off the inside of the mould from contact with the outside atmosphere and, alternately, for retaining said components in a separated position at at least one specific distance from each other.

3,976,247
LOW-TEMPERATURE MELTING METALS SPRAY-GUN

Maniglia Carmelo, 3/3 Via Ippolito d'Aste, Genoa, Italy (16100)

Filed Dec. 22, 1975, Ser. No. 643,057
Claims priority, application Italy, Dec. 23, 1974, 13105/74
Int. Cl.² B05B *1/24*
U.S. Cl. 239—135 **7 Claims**

1. A low temperature melting metals spray gun comprising in combination a pot for the metal to be sprayed, means for heating said pot, a spray nozzle mounted at the bottom of said pot and comprising an innermost nozzle communicating with the interior of the pot through a needle valve, and a concentric outer nozzle communicating with an air feed duct, a handle secured to said pot and provided with manually operable trigger means controlling the operation of the needle valve of the metal spray nozzle and the operation of an air cut-off valve mounted in a duct connected at one end to a compressed air source and at its other end to the inlet of an air circulating chamber mounted in heat-exchange relation with said pot, and

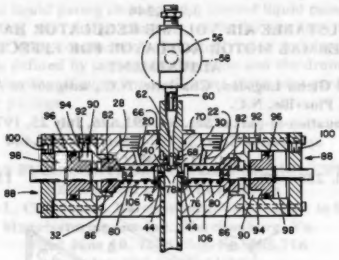


having its outlet connected to the air feed duct of said outer nozzle.

3,976,248
POLYURETHANE POUR GUN

Gary Lee Middleton, Sr., San Lorenzo, Calif., assignor to Polymir Industries, Inc., Oakland, Calif.

Filed Apr. 28, 1975, Ser. No. 572,059
Int. Cl.² B05B *7/04*
U.S. Cl. 239—416.1 **10 Claims**



1. Apparatus for thoroughly mixing two mutually soluble liquid reactants and delivering the resulting mixture at substantially atmospheric pressure and before any substantial reaction has occurred there between comprising:

a. an elongated cylindrical mixing chamber of substantially constant internal diameter open at one end thereof and closed at the other end thereof by reentrant means providing an open ended annular volume at said other end thereof;

b. means for introducing pressurized air into said open ended annular volume including an air discharge opening in wall defining said open ended annular volume;

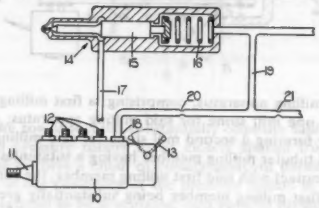
c. means for introducing a first one of said two liquid reactants into said chamber adjacent said open end of said annular volume including a first liquid discharge port through the wall of said chamber at a point spaced from said open end of said annular volume toward said open end of said chamber; and

d. means for introducing the other one of said two liquid reactants into said chamber adjacent said open end of said annular volume including a second liquid discharge port through the wall of said chamber at a point spaced from said open end of said annular volume toward said open end of said mixing chamber.

3,976,249
FUEL INJECTION SYSTEMS FOR INTERNAL COMBUSTION ENGINES

Boaz Antony Jarrett, Sevenoaks, England, assignor to C.A.V. Limited, Birmingham, England

Continuation of Ser. No. 469,557, May 13, 1974, abandoned. This application Apr. 14, 1975, Ser. No. 567,686
Claims priority, application United Kingdom, May 12, 1973, 22720/73
Int. Cl.² B05B 1/30; F02M 47/00
U.S. Cl. 239—533 **7 Claims**



1. In a fuel injection system having a fuel injection nozzle including valve means and pump means including an adjustable quantity control member for delivering fuel to said nozzle means for opening said valve means and dispensing fuel, the combination including means for supplying fluid pressure to said valve means for closing said valve means, and means responsive to said control member to vary said fluid pressure so that at least in part said fluid pressure is dependent upon the setting of said quantity control member.

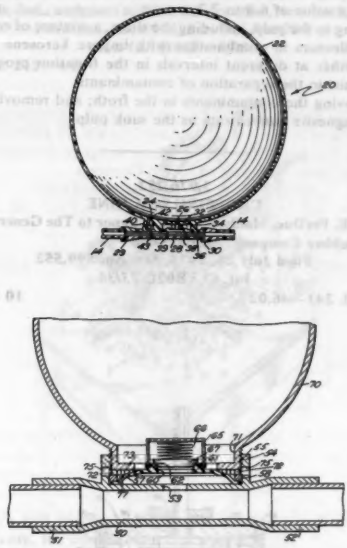
3,976,250
IRRIGATION DEVICE

Harlan A. Bentzinger, 928 E. Canton Road, Edinburg, Tex.

Continuation-in-part of Ser. No. 415,536, Nov. 14, 1973, abandoned. This application Mar. 7, 1975, Ser. No. 556,454
Int. Cl.² B05B 1/30
U.S. Cl. 239—533 **4 Claims**

1. An irrigation system comprising a supply conduit from a source of fluid under pressure, a control valve in said conduit, at least one pressure tank having an inlet port, said supply conduit connected to said port, a discharge port means connected to said tank, a check valve means between the supply conduit and said inlet port means to said tank, a substantially flat diaphragm control valve having two faces, one face closing the said discharge port and the other face exposed to the supply conduit, said check valve having an opening pressure greater than the closing pressure of said diaphragm control valve.

2. An irrigation device for the supply of a controlled amount of water from a source to soil comprising a pressure vessel, an opening to said vessel, a conduit from said source to said opening in said vessel, a substantially flat diaphragm control valve having two faces, one face closing the opening and the other face exposed to the supply of water in said conduit, an inlet opening through said diaphragm having a check valve, a source of water in a conduit, said source connected to said inlet opening through said check valve, and an outlet passage

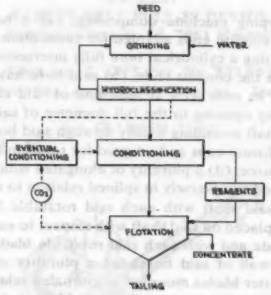


communicating with the interior of said vessel through said opening.

3,976,251
SEPARATION OF MAGNESITE FROM ITS CONTAMINANTS BY REVERSE FLOTATION

Theodor Gambopoulos, and Antony Nestoridis, both of Athens, Greece, assignors to Financial Mining - Industrial and Shipping Corporation, Athens, Greece

Filed Dec. 6, 1974, Ser. No. 530,396
Claims priority, application Greece, Dec. 19, 1973, 3410
Int. Cl.² B02C 23/18
U.S. Cl. 241—20 **8 Claims**



1. A process for separating magnesite from its contaminants by a reverse flotation treatment of crushed magnesite ore which contains as its main constituents magnesium carbonate, and contaminants such as silica, generally silicate compounds of iron, aluminum and calcium, comprising the steps of:

wet grinding the crushed ore to obtain a pulp having a grain size of not more than 0.21 millimeter and a minimum amount of slime;

adjusting the density of the pulp to between about 20 and about 30 percent by weight of solids;

adjusting the pH of the pulp, without removal of the slime, to a value of 6.8 to 7.2;

adding to the pulp, including the slime, a mixture of cationic collectors in combination with impure kerosene and a frother at different intervals in the flotation process to assist in the separation of contaminants;

removing the contaminants in the froth; and removing the magnesite concentrate as the sunk pulp.

3,976,252

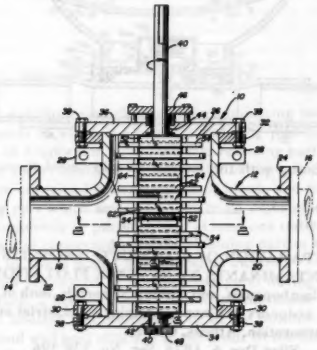
CHOPPING MACHINE

James E. PerDue, Madison, Ohio, assignor to The General Tire & Rubber Company, Akron, Ohio

Filed July 28, 1975, Ser. No. 599,552

Int. Cl.² B02C *23/36*

U.S. Cl. 241—46.02 **10 Claims**



1. A chopping machine comprising: (a) a hollow body defining two conduit ends adapted for connection into a flow line and defining a cylindrical bore fully intersecting the flow path between the conduit ends; (b) said bore having closure caps at both its ends with at least one of said caps being a removable cap opening to the full diameter of said bore; (c) a rotatable shaft extending axially through said bore, through one of said closure caps and adapted for rotation by an external power source; (d) a plurality of elongated rotatable cutter blades fastened transversely in splined relation to said shaft to rotate with said shaft with each said rotatable blade being angularly displaced on said shaft with respect to each adjacent rotatable blade and with each said rotatable blade extending near to the wall of said bore; (e) a plurality of elongated stationary cutter blades mounted in journaled relation on said shaft with each said stationary cutter blade being disposed adjacent a rotatable cutter blade and extending to the wall of said bore with the combination of said rotatable blades and said stationary blades being adapted to effectively intersect the complete flow path between said conduit ends; and (f) retainer means within said bore adapted to retain said stationary cutter blades against rotation; said shaft, said rotatable cutter blades and said stationary cutter blades all being removable from said body and replaceable in said body together with removal and replacement of said removable cap.

3,976,253

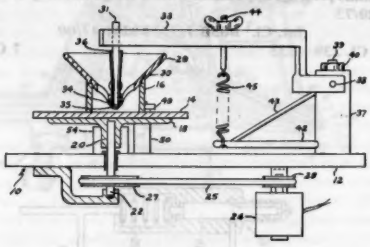
EXCENTER MILL

Gustav K. Medicus, 7521 W. Hyland Drive, Dayton, Ohio 45424

Filed May 12, 1975, Ser. No. 576,506

Int. Cl.² B02C *23/00*

U.S. Cl. 241—167 **2 Claims**



1. A milling apparatus, comprising: a first milling member forming one mill stone for said milling apparatus; a tubular member forming a second mill stone for said milling apparatus; said tubular milling member having a sutatantially planar end in contact with said first milling member; the surface area of said first milling member being substantially greater than the total end area of said tubular member; means for rotating the flat milling member around its central axis, means for positioning the tubular member on the flat milling member with the central axis of the tubular member displaced from the central axis of the flat milling member; means for supplying milling good to said tubular member; a container positioned adjacent the edge of said disc member; means for scraping milled material from said flat milling member into said container; said means for supplying milling good to said tubular member including a funnel shaped member fitting into the top of said tubular member; said means for positioning the tubular member on the substantially flat milling member including a pivotable arm member; means for supporting said arm member adjacent said flat milling member; a shaft supported on said arm; said shaft having a ball shaped end portion; said funnel shaped member including a ball socket for engaging the ball shaped end portion of said shaft; means within said funnel member for keeping milling good from entering said ball socket.

3,976,254

MACHINE FOR GRANULATING STRANDS OF MATERIAL

Hans Hench, Sr.; Friedrich Hunke, both of Grossostheim, and Claus Wolber, Hosbach, all of Germany, assignors to Automatik Apparate-Maschinenbau Hans Hench GmbH, Grossostheim, Germany

Continuation of Ser. No. 494,494, Aug. 5, 1974, abandoned. This application Sept. 3, 1975, Ser. No. 609,986

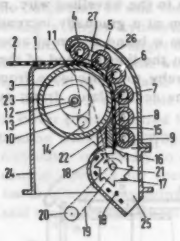
Claims priority, application Germany, Aug. 10, 1973, 2340614

Int. Cl.² B02C *23/02, 18/44*

U.S. Cl. 241—222 **10 Claims**

1. In an apparatus for granulating elongated material including housing means, a rotary cutting tool supported in said housing means, a transport cylinder arranged for rotation in said housing means, a feed-in table arranged, as viewed in the direction of material advance, upstream and substantially tangentially relative to said transport cylinder and reaching toward an infeed point, a run-off table arranged also substantially tangentially relative to said transport cylinder, said run-off table having a downstream end forming a counter ledge for said rotary cutting tool which is arranged for cooperating with said counter ledge, and material guide means arranged for cooperation with said transport cylinder, the improvement

comprising a row of rollers each of which is a pressure roller, said row of pressure rollers forming said guide means, said pressure rollers having diameters substantially less than the diameter of said transport cylinder, means for rotatably supporting said pressure rollers in said housing means adjacent to said transport cylinder so that the first, upstream pressure roller is located to form together with said transport cylinder said infeed point, and so that the last, downstream pressure



roller in the row is located substantially opposite said run-off table, said pressure rollers being closely spaced from each other so as to form a chain of closely adjacent parallel pressure lines at the periphery of the pressure rollers in contact with the material to be granulated, said parallel pressure lines extending across the width of the transport cylinder from said infeed point to said run-off table, said pressure rollers providing the sole guiding means for said material on the side thereof away from said transport cylinder.

3,976,255

JAW CRUSHERS

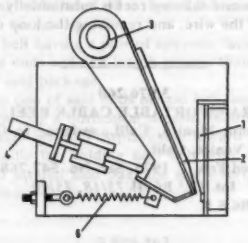
Albert Edwards, Peterborough, England, assignor to Baker Perkins Holdings Limited, Peterborough, England

Filed Mar. 13, 1975, Ser. No. 558,164

Claims priority, application United Kingdom, Apr. 2, 1974, 14558/74

Int. Cl.² B02C *1/04*

U.S. Cl. 241—264 **4 Claims**



1. A jaw crusher including a pressure relieving system comprising a fluid pressure cylinder for holding a movable crusher jaw in a normal operating position, against the action of a resilient member urging the jaw outwardly from said operating position, and a control system for exhausting fluid from the cylinder when crushing pressure on the movable jaw rises above a predetermined value to allow the resilient means to move the jaw outwardly to a pressure relieving position and for subsequently readmitting pressure fluid to the cylinder to return the jaw to said normal operating position against the action of the resilient means, said fluid pressure cylinder comprising a hydraulic cylinder, and said control system including an air/liquid intensifier unit for controlling liquid pressure within the cylinder by the supply and exhaust of air to and from said unit.

3,976,256

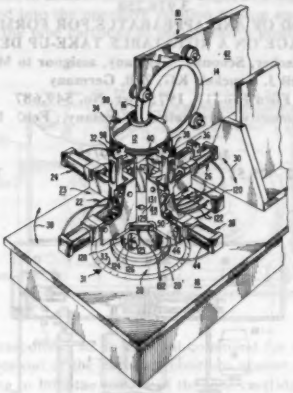
AUTOMATIC COIL WINDING MACHINE AND METHOD

Horst Eugen Haslau, and Glenn Arvid Mattson, both of Indianapolis, Ind., assignors to RCA Corporation, New York, N.Y.

Filed Jan. 28, 1975, Ser. No. 544,701

Int. Cl.² H01F *41/08*

U.S. Cl. 242—4 B **14 Claims**



1. In a coil winding machine for winding a coil about a hollow core, the combination comprising:

a base,

a rotating indexing head mounted on said base,

annular coil winding means mounted in a given position on said base for engaging said core in interlinked spaced relationship during said winding,

a plurality of core clamps mounted on said indexing head, said head and clamps rotatably securing said core to said base, and

means including clamp actuating means coupled to said clamps and responsive to the indexed position of said head for automatically causing selected ones of said clamps to clamp said core in accordance with the angular position of each of said clamps with respect to said coil winding means.

3,976,257

SAFETY BELT PULL-IN DEVICE

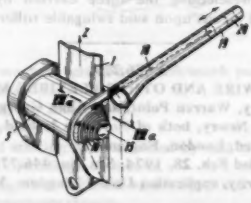
Artur Föhl, Schelmenwasenstr. 68, 7061 Haubersbronn, Germany

Filed Jan. 2, 1975, Ser. No. 537,963

Claims priority, application Germany, Jan. 3, 1974, 2400141

Int. Cl.² B65H *75/02*

U.S. Cl. 242—55 **15 Claims**



1. A safety belt pull-in device, especially for land and air vehicles, which includes in combination: a rotatable reel comprising a shaft, safety belt means having one end connected to said reel, and being windable upon and off said reel, the other end of said belt means being connectable to a stationary belt.

and motor means operatively connected to said reel for winding said belt means onto said reel and permitting a substantially constant unwinding of said belt means off said reel subject to avoiding self-binding during application of only at least approximately even force for permitting withdrawal of said safety belt means.

3,976,258

METHOD OF AND APPPARATUS FOR FORMING A PACKAGE ON A ROTATABLE TAKE-UP DEVICE

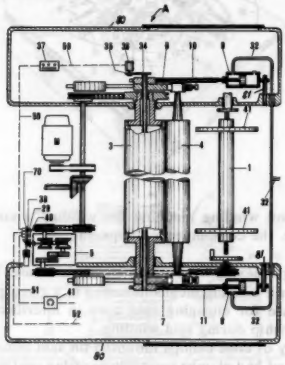
Markus Ruscher, Schonau, Germany, assignor to Maschinenfabrik Zeil J. Kruckels KG, Zell, Germany

Filed Feb. 13, 1975, Ser. No. 549,687

Claims priority, application Germany, Feb. 16, 1974, 2407476

Int. Cl.[2] B65H *59/38*

U.S. Cl. 242—75.51 **19 Claims**



1. An apparatus for forming a package on a rotatable take-up comprising a rotatable take-up; first means for feeding an elongated flexible workpiece towards said take-up to be wound onto and form a package on the same, including a swingable tensioning roller adapted to exert tension upon the workpiece; variable second means for rotating said take-up in dependence upon the diameter of the package thereon; fluid-activated third means for said swingable roller to press the same against said workpiece; an electric control circuit for said variable second means, including a first adjustable potentiometer; a tension-control circuit for controlling the tension exerted by said swingable roller, including a second adjustable potentiometer mechanically coupled with said first potentiometer, and a third adjustable potentiometer electrically coupled with said second potentiometer; and fourth means including cam surface means and slidable follower means whose movements are controlled by the adjustments of said third potentiometer, for preselecting the force exerted by said fluid-activated third means upon said swingable roller.

3,976,259

WINDING WIRE AND OTHER FLEXIBLE MATERIAL

John Newberry, Warren Point, and Allan George Albert Edward Ettie, Newry, both of Northern Ireland, assignors to BICC Limited, London, England

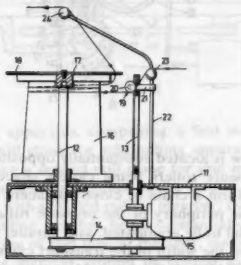
Filed Feb. 28, 1974, Ser. No. 446,773

Claims priority, application United Kingdom, Mar. 1, 1973, 10033/73

Int. Cl.[2] B65H *51/20*

U.S. Cl. 242—78 **3 Claims**

1. A method of temporarily storing wire being continuously drawn from a processing apparatus or other supply to a rotatably-driven take-up reel while the reel is being replaced, which method comprises positioning between the supply and the rotatably-driven take-up reel a wire accumulator comprising an accumulator drum supported on a frame with one end free and means for rotatably driving the drum about its axis at any speed within a limited range of speeds; passing a loop of wire travelling from the supply to the take-up reel over the free end of the accumulator drum and on to the drum causing the travelling wire to be drawn over the free end of the drum and, as the travelling wire passes over said free end, continuously imparting tension to the travelling wire; rotatably driving the accumulator drum at a gradually increasing speed until the accumulator drum is being driven at a peripheral speed substantially equal to the linear speed of the wire; stopping the take-up reel thereby to cause wire from the supply to be wound around the accumulator drum; cutting the length of



wire extending between the wire accumulator and the take-up reel and replacing the take-up reel by another take-up reel; securing the free end of the length of wire extending from the wire accumulator to the second take-up reel; rotatably driving the second take-up reel at a gradually increasing speed until the peripheral speed of the second take-up reel is substantially greater than the peripheral speed of the accumulator drum so that wire is unwound over the free end of the accumulator drum under a continuously imparted tension and is wound around the second take-up reel; effecting a gradual decrease in speed of the second take-up reel as the amount of wire on the accumulator drum is reduced until, when a single loop of wire remains wound on the accumulator drum, the peripheral speed of the second take-up reel is substantially equal to the linear speed of the wire; and removing the loop of wire from the drum.

3,976,260

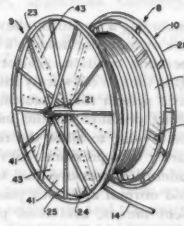
TRANSPORTABLE CABLE REEL

Harry Irik, Santa Monica, Calif., assignor to Grantham & Oleson, Inc., Venice, Calif.

Filed Feb. 7, 1975, Ser. No. 547,768

Int. Cl.[2] B65H *75/18, 75/40*

U.S. Cl. 242—86.5 R **3 Claims**



1. A transportable cable reel for receiving, transporting and discharging cable, comprising:

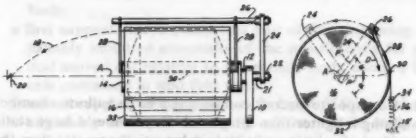
a central shaft;
a hub surrounding each end of the shaft end rotatable thereon, a rotating wheel rim being connected to each hub by a plurality of spokes;
a drum comprising an inner cylinder located on said shaft at a location between said hubs and securely connect with said shaft;
a plurality of support rods extending outwardly from sid inner cylinder at each end thereof, a pair of outer rings connected to the outer ends of said rods;
said drum comprising a larger cylindrical member connected to said rods and having a larger diameter than said inner cylinder for receiving the cable wound on the reel;
means for securing the end of said cable to said cylindrical member prior to winding of said cable thereon; and
a pair of solid, flat cover plates secured to said rods, each cover plate extending without interruption from an end from said inner cylinder outwardly to one of said rings and having a central opening for receiving said inner cylinder, said cover plates preventing insertion of an object through said spokes of said wheel and between said support rods.

3,976,261

BELT-TYPE THREAD-SUPPLY APPARATUS

Erich Lang, Arbon, Switzerland, assignor to Evolution SA, Rorschach, Switzerland

Filed Oct. 7, 1975, Ser. No. 620,425
Claims priority, application Germany, Oct. 16, 1974, 2449267
Int. Cl.² B65H *59/04*
U.S. Cl. 242—128 **8 Claims**



1. A thread-supply apparatus comprising:
a horizontal spindle for supporting a yarn package,
a guide for withdrawal of a thread horizontally from said package on said spindle,
a flexible belt having a pair of opposite faces and a pair of opposite ends and of a length greater than the circumference of said package,
a weight at one of said ends of said belt, and
means including a horizontal support secured to the other end of said belt and displaceable toward and away from said spindle for holding said belt with said inner face wrapped around said package and overlying said outer face at least adjacent said support.

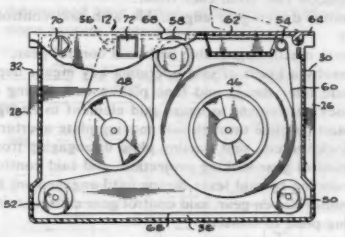
3,976,262

MAGNETIC TAPE CARTRIDGE RECORDER HAVING RELEASABLE CARTRIDGE CATCH ARRANGEMENT AND NON-RESONANT TYPE DRIVE

Charles J. Kennedy, Pasadena, Calif., assignor to C. J. Kennedy Company, Altadena, Calif.

Filed Dec. 17, 1973, Ser. No. 425,301
Int. Cl.² G03B *1/04*; G11B *15/32*
U.S. Cl. 242—192 **5 Claims**

1. An arrangement for releasably holding a magnetic tape cartridge in an operative position within a recorder, said cartridge having opposite edges which are receivable within grooves in opposite guides on the recorder for sliding movement into and out of the operative position and a notch in each of the opposite edges, comprising:
a pair of opposite catches mounted on the recorder adjacent the grooves in the opposite guides, the catches being movable into and out of an engaging position in which the catches reside within the notches in the opposite edges of a tape cartridge to hole the tape cartridge in the operative position, the catches determining the operataive position of a tape cartridge within the recorder:
means for normally biasing the catches into the operative position, the catches thereby being biased into the notches in each of the opposite edges of a tape cartridge moved into the operative position to stop and positively hold the tape cartridge in the operative position;



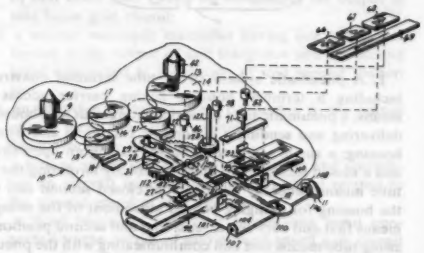
means responsive to an external command for moving the catches out of the engaging positions against the normal bi ing to initiatae release of the tape cartridge from the recorder; and
means for normally urging the tape cartridge out of the operative position whenever the tape cartridge is in the operative position, said means for normally urging being ineffective to urge the tape cartridge out of the operative position whenever the catches are in the engaging positions.

3,976,263

OPERATING SYSTEM IN A MAGNETIC TAPE REPRODUCER AND RECORDER

Nobuo Suzuki, Sagamihara, Japan, assignor to Technical Incorporated, Japan

Filed Oct. 29, 1974, Ser. No. 518,968
Int. Cl.² G03B *1/04*; G11B *15/32*
U.S. Cl. 242—201 **5 Claims**



3. A tape machine adapted for soft-touch push key operation comprising:
a. operating key means;
b. stop key means;
c. a hinged starting plate actuated by said stop key means and said operating key means;
d. a moving plate adjacent said hinged starting plate and having apertures therein;
e. tape reel means having a tape;
f. idler means engageable with said tape reel means for winding and rewinding having a locking element engageable through said moving plate apertures to activate said starting plate below said apertures and to lock in said

apertures when said locking element is engaged by said operating key means;

g. tape pickup and driving means engageable with said tape having a locking element engageable through said moving plate apertures to activate said starting plate below said aperture and to lock in said apertures when said locking element is engaged by said operating key means;

h. a control gear having means for connecting said control gear to said moving plate to cause said plate to translate, a pair of locking means on said control gear engageable with said starting plate, and a pair of cut out portions displaced 180° from each other.

i. a motor driven gear engageable with said control gear; and

j. a lever means engageable with said control gear,

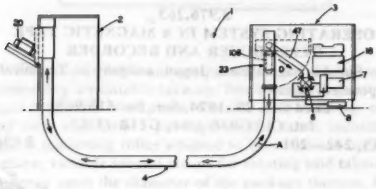
whereby a touch of said operating key means depresses said idler means and tape pickup and driving means locking element to cause said element to engage said starting plate through said moving plate apertures and lock therein, said starting plate disengaging from said control gear locking projection, and said control gear rotating by said lever means until engagement by said motor driven gear, said control gear causing said moving plate to translate.

3,976,264

PNEUMATIC TUBE SYSTEM SWING TUBE TERMINAL CONSTRUCTION

Peter J. Ekama, Malvern; Kenneth R. Hansen, Massillon, and Charles B. Barnett, Akron, all of Ohio, assignors to Diebold, Incorporated, Canton, Ohio

Filed Mar. 12, 1975, Ser. No. 557,497
Int. Cl.² B65G 51/32
U.S. Cl. 243—19 17 Claims



1. A pneumatic system swing tube terminal construction including a terminal housing having carrier access door means; a pneumatic tube communicating with said housing for delivering and sending a pneumatic carrier to and from said housing; a single swing tube means having an open first end and a closed second end; means pivotally mounting the swing tube means generally adjacent the closed second end within the housing for swinging pivotal movement of the swing tube means first end between at least first and second positions; the swing tube means first end communicating with the pneumatic tube when said swing tube means is in the first position, and said first end communicating with the carrier access door means when said swing tube means is in the second position; airflow supply means operatively communicating with the swing tube means; drive means mounted within the terminal housing and operatively connected to the swing tube means for moving said tube means between the first and second positions; and air control means for selectively regulating the direction of the airflow through the swing tube means whereby a carrier can be drawn into the swing tube means through the open first end when said swing tube means is in either the first or second position and is maintained therein by the airflow, and subsequently, can be ejected from the swing tube means either toward the carrier access door means or into the pneumatic tube by a reversal of the airflow direction.

3,976,265

SEMIBUOYANT COMPOSITE AIRCRAFT

Donald B. Doolittle, Hockessin, Del., assignor to All American Industries, Inc., Wilmington, Del.

Continuation-in-part of Ser. No. 357,636, May 7, 1973, Pat. No. 3,856,236. This application Dec. 23, 1974, Ser. No. 535,417
Int. Cl.² B64C 37/02
U.S. Cl. 244—2 8 Claims

1. A composite aircraft comprising a large balloon chamber containing a lighter-than-air gas which provides a large static lifting force having a magnitude substantially greater than the weight of said aircraft, said aircraft having a substantially vertical axis, a set of substantially horizontally disposed wings extending radially relative to said vertical axis, a structural assembly connected to said aircraft at said vertical axis for supporting said wings in a substantially horizontal radial array relative to said aircraft, rotatable coupling means connecting said wings to said structural assembly and permitting adjustment of the effective angle of attack of said wings, thrust means mounted upon said wings whereby said wings and chamber are rotated about said axis, control means connected to said wings for varying their effective angle of attack to either provide a dynamic lifting force for augmenting said static lifting force whereby said combined static and dynamic lifting forces are sufficient to lift large weights or to provide a strong negative dynamic lift for overcoming said static lift and moving said aircraft towards the ground, said control means comprising a lift command control system, said lift command control system being constructed and arranged to adjust the effective angle of attack of said wings to obtain a predetermined aerodynamic force, said structural assembly comprising a girder network emanating substantially from the center of said balloon chamber, an indentation in the bottom of said balloon chamber having its apex disposed substantially at the center of said balloon chamber, a control console being disposed below said balloon chamber, rotatable joint means connecting said control console substantially to the center of said girder network, a stabilizing device being connected to said control console for preventing it from rotating with said balloon chamber, heating means in said balloon chamber for controlling the temperature and lifting force of said lighter-than-air gas in said chamber and temperature control means connected to said heating means for controlling the internal pressure of said aircraft.

3,976,266

MISSILE WITH CRUCIFORM GUIDANCE SYSTEM

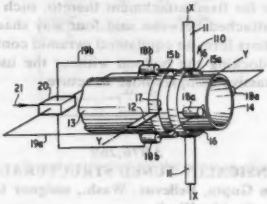
Jean Henri Fieuzal, Rueil Malmaison; Louis Gaston Bourgine, Chambourcy; André Camille Jean, Conflans Sainte Honorine, and René Pierre Benzoni, Paris, all of France, assignors to Etat Francais, France

Filed Mar. 29, 1974, Ser. No. 456,266

Claims priority, application France, Apr. 17, 1973, 73-13815

Int. Cl.² F42B *15/16*

U.S. Cl. 244—3.21 13 Claims



1. A missile comprising a missile body, and a cruciform guidance system provided on said missile body, said guidance system comprising;

a first pair of fins disposed in a first common plane and extending diammetrically outwardly of the missile body;

a second pair of fins disposed in a second common plane and extending diammetrically outwardly of the missile body;

a first support carrying said first pair of fins and being adjustably mounted externally of the missile body for pivotal movement relative to the missile body about a first axis contained in said first plane;

a second support carrying said second pair of fins and being adjustably mounted externally of the missile body for pivotal movement relative to the missile body about a second axis contained in said second plane, said first and second axes being mutually perpendicular when viewed from one end of the missile body;

first control means coupled with said first support and operable to effect pivotal adjustment of said first support about said first axis so as to vary the angle of said first plane relative to the longitudinal axis of the missile body; and

second control means coupled with said second support and operable to effect pivotal adjustment of said second support about said second axis so as to vary the angle of said second plane relative to the longitudinal axis of the missile body, said first and second supports comprising rigid annular supports each of which surrounds the missile body with a predetermined radial clearance, each said clearance determining the range of pivotal adjustment for the corresponding annular support.

3,976,267

VERTICAL GLIDE SLOPE CONTROL SYSTEM INCLUDING COMPLEMENTARY FILTER

David P. Meyer, Bellevue; Gordon F. Ellis, Redmond, and Mohammad A. El-Moslimany, Seattle, all of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Nov. 14, 1974, Ser. No. 523,680

Int. Cl.² B64C *13/18*

U.S. Cl. 244—186 1 Claim

1. A vertical glide slope control system for use in an aircraft automatic landing system, wherein a glide slope beam is followed by an aircraft toward a landing, to control the vertical movement of the aircraft, said vertical glide slope control system comprising:

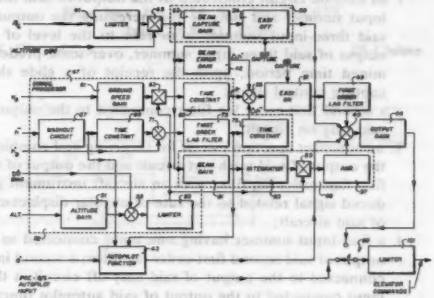
a. a first limiter for receiving and limiting glide slope error plus distortion signals received by said aircraft;

b. a first two-input multiplier having one input connected to the output of said first limiter and a second input for receiving altitude related signals produced by the instruments of said aircraft;

c. a glide slope capture circuit comprising:

1. a beam capture gain circuit connected to the output of said first two-input multiplier; and,

2. an easy-off circuit connected to the output of said beam capture gain circuit for reducing the output of said beam capture gain circuit to zero, over some predetermined time period, upon the receipt of a glide slope capture control signal;



d. a touchdown circuit comprising:

1. an altitude gain circuit for amplifying altitude related signals produced by the instruments of said aircraft;

2. a first two-input summer having one input connected to the output of said altitude gain circuit and a second input for receiving a touchdown bias signal; and,

3. a second limiter having its input connected to the output of said first two-input summer for limiting the output of said first two-input summer;

e. an integral glide slope gain circuit comprising:

1. a beam gain circuit having its input connected to the output of said first two-input multiplier for amplifying the output of said first two-input multiplier;

2. an integrator havings its input connected to the output of said beam gain circuit for integrating the output of said beam gain circuit;

3. a second two-input multiplier having one input connected to the output of said integrator and the second input connected to the output of said second limiter; and,

4. an amplifier having its input connected to the output of said second two-input multiplier;

f. a signal processor comprising:

1. a ground speed gain circuit for receiving and amplifying an aircraft instrument produced signal related to the ground speed of said aircraft;

2. a third two-input multiplier having one input connected to the output of said ground speed gain circuit and a second input connected to the output of said second limiter;

3. a first time constant circuit connected to the output of said third two-input multiplier for delaying the output of said third two-input multiplier;

4. a wash-out circuit for receiving an aircraft instrument produced signal related to the vertical acceleration of said aircraft;

5. a second time constant circuit connected to the output of said wash-out circuit for delaying the output of said wash-out circuit;

6. a second two-input summer having one input connected to the output of said second time constant circuit and a second input for receiving an aircraft instrument produced barometric altitude rate signal related

to the rate of altitude change of said aircraft;

7. a first first-order lag filter connected to the output of said second two-input summer; and,

8. a third time constant circuit connected to the output of said first-order lag filter for delaying the output of said first first-order lag filter;

g. a beam error gain circuit connected to the output of said first multiplier for amplifying the output of said first multiplier;

h. a three-input summer having its first input connected to the output of said beam error gain circuit; its second input connected to the output of said first time constant circuit; and, its third input connected to the output of said third time constant circuit;

i. an easy-on circuit connected to the output of said three-input summer and suitable for increasing the output of said three-input summer from zero to the level of the output of said three-input summer, over some predetermined time period, upon the receipt of a glide slope capture control signal;

j. a second first-order lag filter connected to the output of said easy-on circuit;

k. an autopilot function circuit for receiving and combining the output of said wash-out circuit and the output of said first first-order lag filter with an aircraft instrument produced signal related to the rate of angular displacement of said aircraft;

l. a four-input summer having one input connected to the output of said second first-order lag filter; a second input connected to the output of said easy-off circuit; a third input connected to the output of said autopilot function circuit; and a fourth input connected to the output of said amplifier; and,

m. an output gain circuit having its input connected to the output of said four-input summer, the output of said gain circuit being adapted to control the vertical movement of said aircraft in accordance with the aircraft instrument produced signals applied to the inputs of said vertical glide slope control system in a manner such that the effect of high frequency distortions in said glide slope error signal received by said first limiter are substantially eliminated.

3,976,268

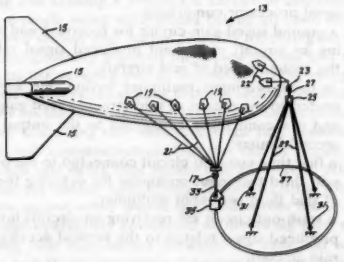
TETHERED BALLOON MOORING MEANS

Edward L. Crosby, Jr., Indialantic, Fla., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Apr. 8, 1975, Ser. No. 566,163

Int. Cl.[2] B64F 1/12

U.S. Cl. 244—115 3 Claims



1. In a system for mooring a tethered aeroform balloon having a plurality of load patches fixedly attached to both lower sides of said balloon, a corresponding plurality of suspension lines extending from said load patches to the confluence point of said lines, a trolley positioned directly under the confluence point, a circular monorail in operative engagement with said trolley, and a line between said trolley and the confluence point, the improvement comprising a series of nose patches fixedly attached to the nose portion of said balloon, a corresponding series of lines one each extending forward from said nose patches beyond the nose of said balloon, a hook member positioned at the nose of said balloon to receive said series of lines from said series of nose patches, a four way shackle operatively connected to said hook member, means connecting said four-way shackle to the ground consisting of a plurality of flexible rope lines extending downward from said four way shackle to reach the ground and a corresponding plurality of ground anchors symetrically positioned within the circular monorail each receiving one rope line from said four way shackle for fixed attachment thereto, such that the said rope lines attached between said four way shackle and said ground anchors form an equilateral pyramid configuration for effectively docking the balloon without the use of a tower mast and massive complex nose structure.

3,976,269

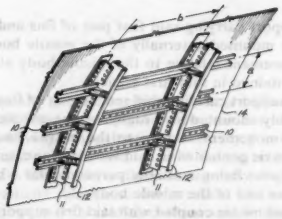
INTRINSICALLY TUNED STRUCTURAL PANEL

Gautam Sen Gupta, Bellevue, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Dec. 19, 1974, Ser. No. 534,518

Int. Cl.[2] B64C 1/12

U.S. Cl. 244—119 7 Claims



1. A structural panel comprising:

a skin of uniform thickness, and;

an orthogonal network of uniformly spaced stiffeners attached to said skin and dividing said skin into a plurality of sub-panels, the fundamental flexural natural frequency of a sub-panel vibrating as a diaphragm being substantially equal to the fundamental natural frquency of an adjoining stiffener vibrating in bending in a plane normal to the skin.

3,976,270

DETECTION OF SURFACE ICE ACCRETION

Brian George Catchpole, Burwood, Australia, assignor to The Commonwealth of Australia, Australia

Filed July 22, 1975, Ser. No. 598,057

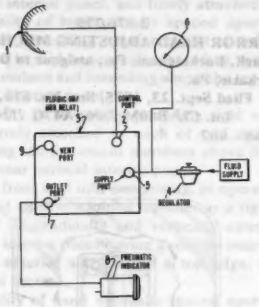
Claims priority, application Australia, Aug. 5, 1974, 8400/74

Int. Cl.[2] B64D 15/20

U.S. Cl. 244—134 F 5 Claims

1. An ice detector for use on an aircraft comprising a sensing port adapted to be located in a position where ice accretion is known to occur, means for passing fluid under pressure out through said port, means for sensing an increase in the

pressure of the fluid signifying that the port is blocked by ice, and ice accretion indicator means adapted to be positioned



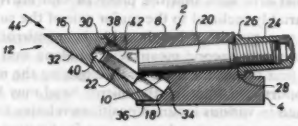
inside the aircraft and activated by the sensing of said pressure increase.

3,976,271

CUTTING TOOL

Gosta Larsson, and Kjell Signar Nystrom, both of Pitea, Sweden, assignors to Pitea Maskin Industri Nystrom & Larsson AB, Pitea, Sweden

Filed June 30, 1975, Ser. No. 591,426
Int. Cl.² B27G *13/00*; F16D *1/00*; B26D *1/12*
U.S. Cl. 144—241 **7 Claims**



1. A cutting tool assembly comprising

a chipping edge cutting tool and an appurtenant tool holder designed for use in wood chippers of a type in which a rotating chipping disc carries a number of cutting tool assemblies on a tool clamping surface and in which one cutting edge of the cutting tool has generally the same length as one dimension of the chips being produced,

said tool holder having a first surface which is normally turned away from the chipping disc and a second surface defining an edge in common with said first surface,

said second surface tapering to said first surface in a wedge-shaped structure to form a cutting tool seat against which said cutting tool can be clamped.

said holder including a setbolt operable to engage and clamp said cutting tool to said holder,

said cutting tool and said holder including positioning structures which by mutual engagement define the position of said cutting tool in relation to said holder such that a cutting tool back surface delimited on one side by the cutting edge is on a level with said first holder surface,

said cutting tool including a surface operable to rest against said cutting tool seat of said holder,

said cutting tool including a groove extending inwardly from said last-mentioned surface of said cutting tool and extending from a point at a predetermined dimension from said back surface of said cutting tool to and through a surface on the side of said cutting tool opposite to said back surface,

the cross section of said groove being wider in the interior of said cutting tool than at said tool surface operable to rest against said cutting tool seat,

said setbolt being positioned and operable to extend through said tool holder at said second surface operable to define said cutter seat,

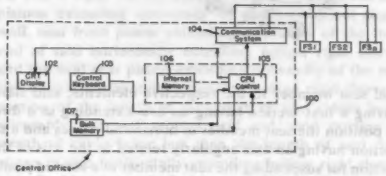
the end of said setbolt extending through said last-mentioned surface having an enlarged end structure operable to be inserted within said groove in said cutting tool and to slide within said groove when said cutting tool is being clamped to said holder.

3,976,272

CONTROL SYSTEM FOR RAILROADS

John R. Murray; Harvey W. Heer, both of Rochester, and Larry G. Carswell, Fairport, all of N.Y., assignors to General Signal Corporation, Rochester, N.Y.

Filed Nov. 18, 1974, Ser. No. 525,039
Int. Cl.² B61L *27/00*
U.S. Cl. 246—5 **28 Claims**



1. A control system for operating track switches and signals of a railroad comprising a plurality of railroad elements including:

a central office from which controls are transmitted to a plurality of field stations over a communication channel and at which indications are received from said field stations indicative of field conditions,

means for designating control requests,

digital computer means responsive to said control requests and to said indications, said digital computer means including means for storing and retrieving

a. dynamic data including indications definitive of the condition of the said railroad elements and the controls for said railroad elements, and

b. static data definitive of each of said railroad elements, the relationship between said elements and the location of dynamic data related to each said element,

processor means included in said digital computer means for accepting said control requests and for interrogating said portions of said dynamic data storage in a sequence determined by said control requests and by said static data, said processor means providing updated controls corresponding to said control requests for transmission to said field stations only if said control requests are determined to be valid by said processor means.

3,976,273

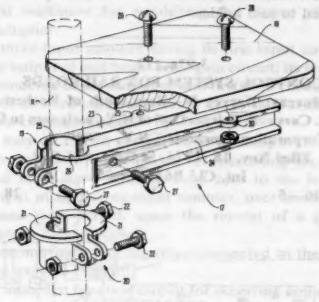
STANCHION WITH MILKING STOOL ATTACHMENT

Thomas Kussow, Rte. 1, Little Suamico, Wis. 54141

Filed Feb. 18, 1975, Ser. No. 550,721
Int. Cl.² F16M *13/02*
U.S. Cl. 248—221 R **6 Claims**

1. In a stowable seat, the combination including a stanchion, a seat member and support means connecting said seat member and said stanchion for freely revolvable and axially slidable movement of the seat member with respect to the axis of the stanchion while maintaining said member in a plane normal to said axis, said support means comprising a pair of elongated complementary elements, each having a semi-cylindrical recess, said recesses defining a collar at one side of said seat closely encircling said stanchion when said elements are assembled in complementary relationship, said elements being provided with complementary bore holes adjacent said re-

cesses to receive at least one fastening element for joining the elements together, the respective elements each having another opening spaced from the bore hole and extending at right angles thereto for receiving fastening means to attach



said seat member to the respective elements, said stanchion having a first section having an axis extending in a direction to position the seat member in horizontal planes and a second section having an axis angularly related to the axis of the first section for suspending the seat member in a stowed position.

3,976,274

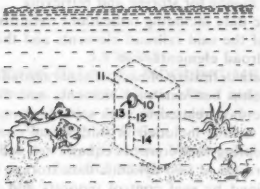
PERMANENT ATTACHMENT FOR SUCTION CUPS

Arthur F. Langguth, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 27, 1975, Ser. No. 581,319

Int. Cl.² A45D *42/14*

U.S. Cl. 248—363 **5 Claims**



1. An apparatus for attaching an object to a surface comprising:

means coupled to the object and defining a cavity for resiliently creating a suction, the creating means is provided with an annular portion resiliently engaging the surface after the cavity has been compressed, the resiliently creating means includes a molded dish shaped shell of a resilient material and the annular portion increases its area of resilient engagement on the surface as the cavity is being compressed;

means mounted radially outwardly from the annular portion for defining a ring shaped recess configured to be reduced in size upon the compression of the cavity, the ring shaped recess having a first portion and a second portion integrally formed with the resiliently creating means, the second portion is disposed radially outwardly of the first portion, said first portion moves radially outwardly toward said second portion as the cavity is compressed to compress the ring shaped recess; and

means disposed in the ring shaped recess and being extruded therefrom as the cavity and the ring shaped recess are being compressed, thereby creating a second sealing surface outside the annular portion for sealing the annular portion on the surface.

3,976,275

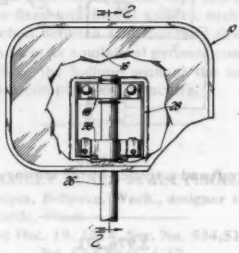
MIRROR HEAD ADJUSTING MECHANISM

Paul D. Clark, Buckingham, Pa., assignor to Delbar Products, Inc., Perkasie, Pa.

Filed Sept. 23, 1975, Ser. No. 615,860

Int. Cl.² B60M *1/06*; A47G *1/24*

U.S. Cl. 248—487 **6 Claims**



1. An adjustable mirror assembly comprising a mirror head having a hollow shell open on one side and a planar mirror member mounted within the open side of said shell, a mirror head support arm extending through an opening in said hollow shell and projecting within the space between said shell and said mirror member, said arm including a major longitudinal axis, first means for adjustably mounting the mirror head upon said support arm such that the plane of said mirror member may be variably inclined to the major axis of the support arm, including to a position wherein said planar mirror is parallel to said major axis second means spaced along said major axis from said first means for frictionally engaging the mirror head to the support arm whereby the mirror head may be frictionally retained in various inclined positions relative to the major axis of the support arm, and stop means for limiting movement of said mirror head along the major axis of the support arm.

3,976,276

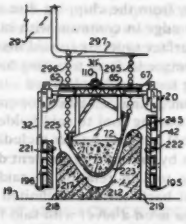
APPARATUS FOR FORMING A CONCRETE FEED BUNK

Billy W. Watson, P.O. Box 1942, Clovis, N. Mex. 88101

Filed Jan. 6, 1975, Ser. No. 538,610

Int. Cl.² B28B *7/16*

U.S. Cl. 249—149 **3 Claims**



1. A concrete mold assembly comprising, in operative combination, an exterior wall assembly, a trough and frame assembly, and a mold clamp assembly:

A. said exterior wall assembly comprising a rigid rear wall unit and a rigid front wall unit;

1. said rigid rear wall unit comprising, in operative combinstion, and all firmly joined together as a rigid unit,

a. a rigid Ingitudinally and vertically extending rear vertical interior panel having a smooth interior surface, and an exterior surface and a top edge and, firmly attached thereto,

b. a plurality of vertically spaced apart longitudinally and horizontally extending rear rigid reinforcement members firmly attached to the exterior surface of said rear vertical interior panel, and firmly attached thereto,

c. a plurality of longitudinally spaced apart rigid rear vertically extending reinforcement members firmly attached to said horizontally extending rear reinforcement members and extending above the top of said rear vertical interior panel,

d. a plurality of forwardly extending rigid rear pistons, each firmly attached to each of said rear vertically extending reinforcement members above the top edge of said rear vertical interior panel;

2. said rigid front wall unit comprising, in operative combination, and all firmly joined together as a rigid unit,

a. a rigid longitudinally and vertically extending front vertical interior panel having a smooth interior surface, and an exterior surface and a top edge, and, firmly attached thereto,

b. a plurality of front vertically spaced apart longitudinally and horizontally extending rigid reinforcement members firmly attached to said front vertical interior panel at the exterior surface thereof, and, firmly attached thereto,

c. a plurality of longitudinally spaced apart rigid front vertically extending reinforcement members and said front vertically extending rigid reinforcement members extending vertically above the top of said front vertical interior panel,

d. a plurality of rearwardly extending rigid front pistons, each firmly attached to one of said front vertically extending rigid reinforcement members above the top edge of said front vertical interior panel;

B. said trough and frame assembly comprising, in operative combination, a longitudinally extending rigid trough mold member and a plurality of horizontally extending rigid sleeves,

1. said longitudinally extending trough mold member having an exterior outline in transverse cross section which outline is downwardly convex and uniform along the entire length of such trough mold member; and said trough mold member having a bottom exterior surface which is smooth and a plurality of longitudinally spaced apart rigid transversely extending members extending across and attached to the transversely spaced apart parts of the interior surface of said trough mold member, an upwardly open chamber in said trough mold member and a weight therein,

2. each of said plurality of horizontally extending hollow rigid sleeves

a. extending transverse to the length of said trough mold member and each of said horizontally extending hollow rigid sleeves having a cylindrical and sturdy yet resilient sleeve wall, said wall having an interior surface, and a slot at each end thereof extending parallel to the central longitudinal axis of said horizontally extending hollow rigid sleeve, each of said slots at each sleeve end being of equal length and there being a resiliently deformable C-shaped sleeve wall portion adjacent thereto; each of said horizontally extending hollow rigid sleeves being parallel to the other of said plurality of horizontally extending hollow rigid sleeves, and each of said horizontally extending hollow rigid sleeves being

b. located above the trough mold member and firmly attached thereto;

3. said front and rear rigid wall units extending downward the same distance from said horizontally extending hollow rigid sleeves and said front and rear rigid wall units walls extending further downward from said transversely extending horizontally extending hollow rigid sleeve than the bottom of said trough mold member;

C. said mold clamp assembly comprising

1. a rigid longitudinally extending rod with portions of uniform transverse diameter adjacent each of said horizontally extending hollow rigid sleeves, rod support means supported on said horizontally extending hollow rigid sleeves, said rod rotatably supported on said rod support means; and drive means attached to said rod,

2. releasable locking means attached to said rod, said releasable locking means comprising a sprocket wheel and a pivotal lock arm having a tooth, said tooth operatively engaging said sprocket wheel;

3. a plurality of paris of flexible cables, each having two ends, one end of one of said cables of each pair thereof attached to said rod and another of the ends of each of said cables extending transversely to said rod and attached to a rigid member located above said trough and firmly attached to one of said vertically extending rigid reinforcement members,

4. a pair of rigid pistons slidably located in each of said horizontally extending hollow rigid sleeves; one, inner, end of each of said pistons extending within said cylindrical sleeve wall, and the other, outer, end of each of said pistons extending outwardly of said cylindrical sleeve wall, said front piston extending outwardly of the front end of said horizontally extending hollow rigid sleeves and the said rear piston extending outwardly of the rear end of said horizontally extending hollow rigid sleeve, a portion of the length of each such of said cables being releasably wrapped around said rod, said portion of length of cable being less than the length of said rigid piston in said horizontally extending hollow rigid sleeve; one of said pistons attached to one of the rigid front wall vertically extending reinforcement members and fitting within one, front, end of one of said horizontally extending hollow rigid sleeves, and another like piston attached to one of said rear rigid vertically extending reinforcement members fitting within the other, rear end of said horizontally extending hollow rigid sleeve; one end of said pair of cables attached to said rigid fron vertically extending members and another end of said pair of cables attached to a rigid member attached to one of said rigid rear vertically extending reinforcement members;

5. a vertically extending space between level of the top and the bottom of each of said pair of rigid pistons and the interior surface of said horizontally extending hollow rigid sleeve, and

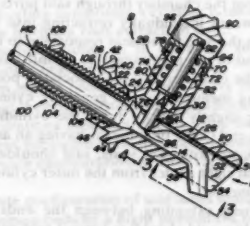
6. a compressed spring located between the inner ends of said front and rear pistons within each of said horizontally extending hollow rigid of said sleeves.

3,976,277

PINCH TUBE VALVE

Donald R. Basel, Garfield Heights, and Raymond P. Kawolics, Solon, both of Ohio, assignors to Tomlinson Industries, Inc., Cleveland, Ohio

Filed Sept. 23, 1974, Ser. No. 508,208
Int. Cl.² F16K 7/06
U.S. Cl. 251—7 **18 Claims**



1. A pinch tube type valve adapted to receive an elongated

flexible tube for selective control of liquid through said tube, said valve comprising:

a valve body having upper and lower surfaces, an inlet end, an outlet end, a first passageway interconnecting said inlet and outlet ends and a second passageway communicating with said first passageway between said ends;

means for closing said valve disposed in said second passageway, said closing means being selectively reciprocable within said second passageway into and out of engagement with said flexible tube in said first passageway for opening and closing said tube; and,

tube retaining means comprising an apertured area in the lower surface communicating with said first passage and extending generally longitudinally along a portion of said lower surface from said outlet end toward said inlet end, said apertured area adapted to receive a portion of said tube adjacent the outermost end thereof for retaining said outermost end angularly disposed of said first passageway.

3,976,278

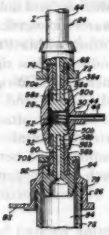
VALVE ASSEMBLY

John F. Dye; William J. Binard, both of Barrington, and Bhupendra C. Patel, Elgin, all of Ill., assignors to The Kendall Company, Boston, Mass.

Continuation of Ser. No. 210,888, Dec. 22, 1971, abandoned. This application Jan. 8, 1975, Ser. No. 539,465

Int. Cl.² F16K *15/14*; F16L *29/00*

U.S. Cl. 251—149.6 **19 Claims**



1. A valve comprising, in combination;

a housing having an elongated cylindrical chamber, a port at each end of the chamber, a seat adjacent each of said ports and extending generally at right angles to the cylindrical wall of said chamber, a stem extending outwardly from the housing intermediate said seats and having a channel extending through the stem communicating between the chamber and the outside of the housing, and a pair of nipples extending from opposite ends of the housing, with each of said nipples having a passageway extending through the nipple and communicating with one of said ports;

double-ended plug means biased in the chamber against both of said seats in sealing engagement to prevent escape of fluid from the chamber through said ports, each end of the plug means individually retracting into the chamber away from the associated seat responsive to force applied to each end of the plug means to permit passage of fluid between the chamber and the associated ports, each end of the plug means having a generally cylindrical shape and being slightly spaced from the cylindrical housing wall, each end of the plug means having an annular shoulder associated with said seats, said shoulders extending generally at right angles from the outer cylindrical wall of said plug means;

a helical spring extending between the ends of the plug means to bias said shoulders toward said seats; and

annular O-ring means co-operating with said shoulders and said seats to provide sealing engagement between the plug means and seats when the shoulders of the plug means are biased by the spring toward the seats.

3,976,279

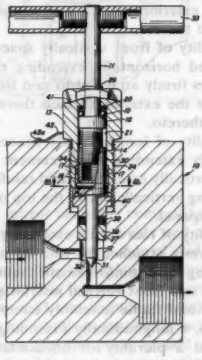
HIGH PRESSURE VALVE

Robert D. Walker, Erie, Pa., assignor to High Pressure Equipment Co. Inc., Erie, Pa.

Filed Nov. 5, 1973, Ser. No. 412,782

Int. Cl.² F16K *31/50*

U.S. Cl. 251—267 **1 Claim**



1. In combination, a valve and stem assembly comprising

a valve having a body,

a gland having a wall defining a bore and a cylindrical counter bore therein,

diametrically spaced axially extending slots in said wall defining said counterbore,

an upper stem and a lower stem extending through said bore in said gland and into said counterbore,

and disposed in axial alignment with each other,

said upper stem having an enlarged cylindrical portion thereon in said counterbore,

an enlarged male threaded member on said upper stem adjacent said enlarged cylindrical portion,

said lower stem having an enlarged hollow internally threaded portion thereon threadably receiving said male threaded member,

a pin extending through said enlarged hollow internally threaded portion of said lower stem,

the ends of said pin being slidably received in said axially extending slots,

whereby said lower stem is restrained to move in an axial direction when said upper stem is rotated relative to said lower stem,

and valve means on the lower end of said lower stem adapted to engage valve means on said valve body,

said valve body having a threaded bore therein,

said gland having threaded means on the outside thereof threadably engaging said threaded bore in said valve body,

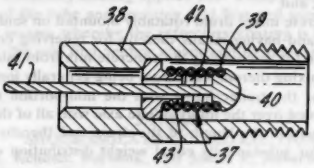
packing means disposed around said lower stem in said body and an upper packing washer supported on said packing means,

and said gland adapted to be rotated, thereby exerting a pressure on said upper packing washer.

3,976,280
ANIMAL-ACTUATED WATERING VALVE

Carl J. Alexander, Moore Park, and Robert J. Boudeman, Hickory Corners, both of Mich., assignors to Wells Manufacturing Corporation, Three Rivers, Mich.

Division of Ser. No. 367,445, June 6, 1973, Pat. No. 3,884,447.
This application Apr. 2, 1975, Ser. No. 564,545
Int. Cl.² F16K 31/44, 15/44
U.S. Cl. 251—339 4 Claims

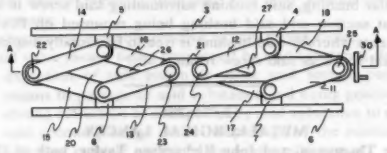


1. An animal actuated watering valve means comprising
a generally cylindrical, hollow valve body;
a coil-type tension spring of closely wound metallic spring wire having a plurality of convolutions, mounted at one end on said hollow valve body and defining a fluid passageway;
an outer sheath of a resilient material having a substantially uniform radial thickness collapsed about the convolutions of said spring and exerting a radial compressive force on the spring wire along the length of said convolutions, the adjacent, outer-sheath-bearing convolutions being in a fluid-tight relationship relative to each other;
fluid impermeable cap means associated with said tension spring and sealing the unmounted end of said fluid passageway; and
an elongated actuator means for deflection by said animal, having one end fixed to said cap means, extending through the defined fluid passageway and projecting outwardly from one end of said valve body, and upon deflection adapted to part adjacent convolutions thereof so as to permit passage of fluid therebetween and through said hollow valve body.

3,976,281
VARIABLE HEIGHT WORK SURFACE

James R. Adamson, Jr., Alexandria, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed June 30, 1975, Ser. No. 591,926
Int. Cl.² B66F 3/00
U.S. Cl. 254—126 1 Claim



1. A vertically adjustable stand comprising:
a work surface;
a base support means;
four scissor type, adjustable legs, each pivotally mounted to one corner of the work surface and the base support means, wherein each leg consists of four links with the ends of the first and second links pivotally connected to the work surface at a common point and the third and fourth links pivotally connected to the base support means at a common point, while the free ends of the first and third links and the second and fourth links, respectively, are interconnected to form outer and inner knee joints respectively, with each knee joint interconnecting respective links between the work and base support means;
two pairs of reciprocating pressure bars, whereby each pair of pressure bars simultaneously applies lateral pressure to the four knees of the scissor type leg arrangement on each side of the stand, each pair of pressure bars consisting of first and second reciprocating bars with each bar pivotally engaged with a respective outer knee joint of one leg and the inner knee joint of the other leg on either side of the stand, each pressure bar further containing an elongated slot intermediate the two pivotally engaged end portions thereof, wherein the inner knee joint connection of each scissor leg on either side of the stand is slideably engaged within the slot associated with the pressure bar pivotally engaged with the outer knee joint of each respective leg;
a pair of frame members intercoupled with a screw drive mechanism coupled to the reciprocating pressure bars at the outermost knee of each scissor leg; and
a screw drive mechanism for applying inwardly directed lateral forces to said frame members which transmit similar forces to said reciprocating pressure bars allowing the pressure bars to exert lateral pressure at the knees of each scissor type leg, thus effectively adjusting the work surface to the desired level.

3,976,282
PLANT ROOT EXTRACTION TOOL

Lester H. Baker, 8221 E. Garfield, Apt. L-104, Scottsdale, Ariz. 85257

Filed Sept. 15, 1975, Ser. No. 613,261
Int. Cl.² B66F 3/00
U.S. Cl. 254—132 10 Claims

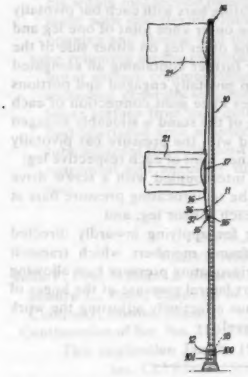
1. A plant root extraction tool comprising:
a handle portion,
a shank portion comprising a circular cross sectional configuration having a root extraction end,
sleeve means adapted to fit upon the shank portion for clampingly engaging therewith, and
a fulcrum means fastened to said sleeve comprising a pair of tangs having substantially cylindrical cross sectional configurations mounted one on each side of said shank and bent backward upon themselves toward said sleeve in an arcuate configuration to form rocking surfaces for said tool,
the arcuate configuration of said tangs being interconnected at common ends by a bight portion for forming a surface for applying pressure to said tool to force it into the ground.

3,976,283

FLAG HOIST

Theodore F. Schmit, Arlington Heights, Ill., assignor to Electronic Flag Poles, Inc., Maywood, Ill.

Filed Feb. 24, 1975, Ser. No. 552,428
Int. Cl.² B66C 23/60
U.S. Cl. 254—146 3 Claims



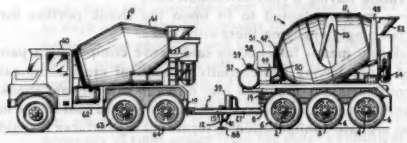
1. In a flagpole assembly employing an endless flag supporting halyard, manually operable hoist means for actuating the halyard comprising: a bi-directionally rotatable sheave wheel having peripheral engagement with the halyard whereby to move the latter responsively with rotation of said sheave wheel, a drive shaft rotatably supported adjacent said sheave wheel, means intercoupling said drive shaft and sheave wheel for actuating the latter in response to driving rotation of said drive shaft, portable hand crank means having a body formed with an open ended socket coaxially receptive of one end of said drive shaft whereby said crank means is detachably mounted on said drive shaft, cooperating means on said body and drive shaft for positively interconnecting said crank means and drive shaft for conjoint bi-directional rotation, multi-position detent means mounted on and movable with said shaft, pawl means adjacent to and normally engaged with said detent means whereby to lock said shaft and sheave wheel against rotation, and cam means provided on said pawl means and operatively engaged by said body in the course of interconnecting said crank means with said shaft whereby to automatically disengage said pawl means from said detent means and free said shaft and sheave wheel for bi-directional rotation in accordance with rotational operation of said crank means.

3,976,284

CONCRETE MIXER TRAILER

Danny R. Hupp, 610 Central, Leavenworth, Kans. 66048

Filed June 23, 1975, Ser. No. 589,122
Int. Cl.² B62D 53/08
U.S. Cl. 259—168 7 Claims



1. A concrete mixer trailer comprising:

a. a trailer frame having a leading end portion and a trailer end portion;

b. at least three longitudinally spaced transverse axles mounted on said trailer frame and arranged as a leading axle and an intermediate axle and a trailing axle, said leading, intermediate and trailing axles being substantially equally spaced with each having dual wheels on opposite ends thereof;

c. a tongue structure having one end with transversely spaced pivotal connections to the leading end portion of said trailer frame for vertical swinging movement about a horizontal axis, the other end of said tongue structure being adapted to be pivotally connected to a prime mover; and

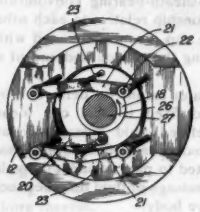
d. a concrete mixer drum rotatably mounted on said trailer frame and having means thereon for receiving concrete mix and for discharging the concrete mix from said drum after mixing therein, said drum being generally longitudinally of the trailer frame with the mid-portion thereof positioned over the intermediate axle with all of the axles being within the length of the drum and thereby under same for substantially equal weight distribution on said axles.

3,976,285

SEALING ARRANGEMENT FOR AN EXTRUSION APPARATUS

David E. Johnson, Macedon, N.Y., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Nov. 13, 1974, Ser. No. 523,395
Int. Cl.² A23C 1/06
U.S. Cl. 259—191 1 Claim



1. An extrusion apparatus, adapted for the production of thermoplastic resin foam from a mixture comprising granular thermoplastic resin, a volatile blowing agent and a fine powdery cell size control additive, comprising an elongated screw disposed inside of an elongated barrel housing, one end of said barrel housing comprising a throat section through which one end of said extruder screw extends, outside of said barrel housing, into operative engagement with a rotary drive means, sealing means in said extruder throat section comprising a circular bushing, said bushing surrounding said screw in said throat section and said bushing being mounted on flexible elements whereby said bushing is free to be radially displaced by said screw as said screw rotates.

3,976,286

METALLURGICAL LANCES

Peter Thompson, and John Richardson Taylor, both of Sheffield, England, assignors to GR-Stein Refractories Limited, Sheffield, England

Filed Aug. 19, 1974, Ser. No. 498,468
Claims priority, application United Kingdom, Aug. 22, 1973, 39696/73
Int. Cl.² C21C 7/00
U.S. Cl. 266—225 6 Claims

1. A lance for injecting fluidized particulate material into molten metal, comprising a metal tube having first anchor means secured to the outer surface of the tube and projecting outwardly from the tube, said first anchor means being se-

cured to the tube at least adjacent the ends of the tube and spaced circumferentially around the tube, and supplementary anchor means formed of wire secured to the tube and extending substantially between said first anchor means, a plurality of barbs spaced along said wire projecting outwardly from said

tube, a refractory coating applied over a major portion of the length of the tube and covering said first and supplementary anchor means, whereby the refractory coating is held to the tube by the said first anchor means and by said wire and said barbs.

3,976,287

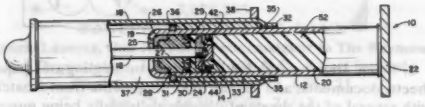
SHOCK ISOLATOR CONSTRUCTION

Giles A. Kendall, Burbank, and James E. Robertson, Woodland Hills, both of Calif., assignors to Menasco Manufacturing Company, Burbank, Calif.

Continuation of Ser. No. 297,757, Oct. 16, 1972, abandoned. This application Aug. 5, 1974, Ser. No. 494,563

Int. Cl.² F16F 9/30

U.S. Cl. 267—139 **9 Claims**



1. A shock isolator apparatus comprising:

a tubular housing having an internal chamber formed therein, said housing having a closed end and an open end;

a compressible solid substance contained within said chamber being capable of absorbing energy;

a piston movably supported within said chamber;

orifice means associated with said piston for permitting said substance to move from one side of said piston to the opposite side of said piston to produce a damping resistance force on said piston head;

a piston rod secured to said piston and extending from said housing through said open end;

sealing means mounted within said chamber adjacent said open end of said housing, said piston rod passing through said sealing means and being movably mounted in respect thereto, said sealing means closing said open end of said chamber, said substance completely filling the portion of said chamber between said piston and said sealing means;

said orifice means comprising first and second passage means;

valve means movable relative to said piston head;

said valve means being positioned by said substance during extension of said piston to close said second passage means to passage of said substance and being positioned during retraction of said piston by said substance to open said second passage means to passage of the substance, said first passage means being continually open;

a sleeve of a larger diameter than said housing, one end of said sleeve being closed and attached to said piston rod, the opposite end of said sleeve being open and located around said housing intermediate the ends thereof; and

an annular stop ring affixed to said housing at a location between said one end and said open end of said sleeve, a rigid non-compressible band located between said stop ring and said open end having a thickness corresponding to the difference in diameter between said sleeve and said housing to thereby be snugly retained therebetween, the open end of said sleeve being crimped over the adjacent end of said band to establish the fully retracted position of said piston, said fully retracted position results in said piston being displaced from said sealing means, said substance being under substantial compression when said piston is in said fully retracted position, whereby said compression is sufficient to automatically return said piston from said extended position to said retracted position.

3,976,288

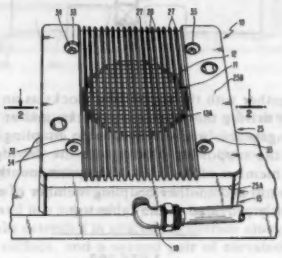
SEMICONDUCTOR WAFER DICING FIXTURE

Salvatore Ralph Cuomo, Jr., Wappingers Falls, N.Y., assignor to IBM Corporation, Armonk, N.Y.

Filed Nov. 24, 1975, Ser. No. 634,693

Int. Cl.² B25B 11/00

U.S. Cl. 269—21 **11 Claims**



1. Apparatus for holding a semiconductor wafer in a predetermined position to permit dicing of the wafer into discrete semiconductor chips of a predetermined size without dislocation of said chips during the dicing operation, said chips being arranged in the wafer with a kerf area intermediate adjacent chips;

said apparatus comprising:

a base member having means defining a semiconductor wafer receiving areas;

means connected to said base member for applying a vacuum thereto;

a plurality of spaced apart apertures in said wafer receiving area and extending into said base member to provide fluid communication with said means for applying a vacuum to said base member;

said apertures being positioned in said wafer positioning area so that at least one aperture underlies each individual chip to be diced from said wafer;

a cover plate having a plurality of interdigitaged ribs and slots, said slots extending through said cover and dimensioned for alignment with the kerfs of said chips;

at least the portion of said rib in confronting relation to said semiconductor wafer receiving area including a resilient compressible material, said resilient compressible material adapted for superimposed pressing relation on a wafer so that when a wafer is being cut through said slots, the vacuum being drawn coupled with the pressing engagement of the ribs on said wafer inhibit dislocation of said chips during a dicing operation.

3,976,289

ASSEMBLY TABLES

Ludovicus Hendrikus Baghuis, Maria van Bourgondiesingel 's-Hertogenbosch, Netherlands, assignor to IVA Gebr. Ten Vaarwerk B.V., Beek, Netherlands

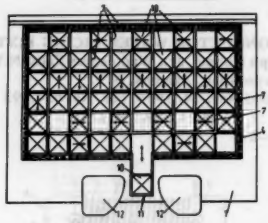
Filed Feb. 25, 1975, Ser. No. 552,963

Int. Cl.² B23Q 1/04

U.S. Cl. 269—56 **12 Claims**

1. An assembly table for precision mechanisms, comprising a frame, a table top, guides provided in said table top, a plural-

ity of supporting blocks which are slidably mounted in said guides for stepwise movement in an endless path, said blocks passing during their movement one after the other at least one station where components for mechanisms carried by the supporting blocks are subjected to treatment, detachable fastening means securing the table top to said frame and enabling said top to be removed from and reinstalled on said



frame together with the supporting blocks as an integral part, means for driving the supporting blocks, and at least two sets of interengageable and disengageable coupling members for coupling the supporting blocks with the driving means, one coupling member of each set being permanently provided in said table top and another coupling member of each set being permanently provided in the table top.

3,976,290

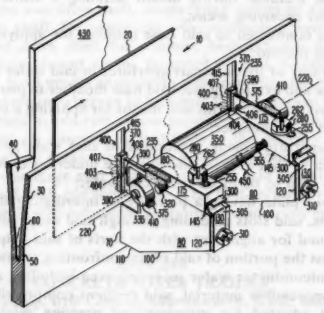
DOCUMENT VIEW STATION

Harry L. Wallace, Garden City, Mich., assignor to Burroughs Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 609,222, Sept. 2, 1975. This application Nov. 3, 1975, Ser. No. 628,386

Int. Cl.² B65H *29/20*, *29/58*

U.S. Cl. 271—64 **34 Claims**



1. Document station apparatus for interceptibly removing selected documents from a flow of documents for purposes of viewing and tactile manipulation, said apparatus comprising:

a. guideway means including a pair of walls for cahnneling the flow of documents therebetween;

b. power means for providing rotational energy along the axis of said power means;

c. a pair of frame means disposed on a first of said pair of walls of said guideway means for operatively supporting said power means; and

d. externally fingered camming means radially disposed along the axis of said power means and traversing said first wall of said guideway means for frictionally engaging a selected document in said guideway means and for applying sufficient holding pressure on the selected document as backed by a second of said pair of walls of said guideway means to arcably cam the selected document up and out of said guideway means.

3,976,291

ARRANGEMENT FOR SEPARATING SHEETS OF PAPER AND THE LIKE

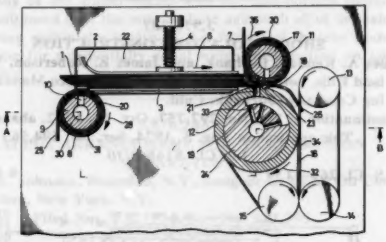
Herbert Bernardi; Erhard Lehle; Joseph Geier, all of Munich; Gerd Von Aschwege, Grobenzell, and Markus Haberstroh, Munich, all of Germany, assignors to G.A.O. Gesellschaft fur Automation und Organisation m.b.H., Germany

Filed Nov. 18, 1974, Ser. No. 524,866

Claims priority, application Austria, Nov. 21, 1973, 9780/73

Int. Cl.² B65H *3/10*, *3/52*, *1/02*

U.S. Cl. 271—94 **15 Claims**



1. In an arrangement for separating or singling out paper sheets, documents, and similar recording media from a batch, with several of the sheets of documents initially being moved toward a separating slot with the aid of an intermittent pull-off device and a vibrating device, after which the leading recording medium is extracted from the batch, with the aid of a further pull-off device and an intermittently acting device serving to hold back the trailing recording media, and fed to a transporting arrangement through the separating slot, the improvement comprising, in combination, a first rotating suction drum mounted at the rear end of the batch, considered in the direction of separation movement, and rotating in a direction to feed the leading recording media toward said separating slot to constitute said intermittent pull-off device, said first suction drum being formed with circumferentially spaced suction channels, a rotary slide valve operatively associated with said first suction drum and operable to connect said suction channels intermittently to a suction system; a vibrating table supporting the batch; a vibrator operable to vibrate said table; said table and vibrator constituting said vibrating device; a second rotating suction drum, formed with suction channels, arranged within the range of said separating slot and serving as a separating drum; a rotating hold-back suction drum also arranged within the range of said separating slot and rotating in a direction opposite the direction of rotation of said first suction drum to serve as said hold-back device; said hold-back suction drum being formed with circumferentially spaced suction channels; and a second rotary slide valve operatively associated with said hold-back suction drum and operable to connect the suction channels thereof intermittently to a suction system.

3,976,292

SUCTION SHAFTS FOR A PAPER COUNTING APPARATUS

Minoru Yoshida, Tokyo, Japan, assignor to Laurel Bank Machine Co., Ltd., Tokyo, Japan

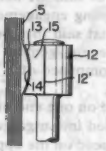
Filed Mar. 19, 1975, Ser. No. 559,874

Int. Cl.² B65H *3/42*

U.S. Cl. 271—95 **2 Claims**

1. Suction shafts used for a paper counting apparatus wherein each of the suction shafts is rotatably mounted in a rotatable cylinder driven counterclockwise and is provided

with a curved suction surface having a center of curvature in a plane perpendicular to the axis of rotation of the suction shaft, said suction shafts being rotatably driven clockwise and each provided with an opening extending to the suction surface for communicating with the interior of the suction shaft



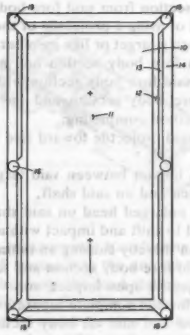
to apply suction to the foremost paper of a bundle of papers facing the suction surface, the sucked paper being curved longitudinally thereof and folded by a trailing edge of the suction surface in a direction perpendicular to the center of curvature thereof as the suction shaft is rotated clockwise.

3,976,293

BOWLING POCKET POOL GAME

Laurie Laureta, Oak Harbor, Wash., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Aug. 18, 1975, Ser. No. 605,221
Int. Cl.² A63B *67/00, 71/12*
U.S. Cl. 273—2 **3 Claims**



1. A bowling game that simulates pocket pool comprising

a playing field of rectangular shape formed with a carpeted floor surrounded by upraised rubber rims, with a pocket formed in each corner of the rim,

a cue bowling ball fitted with finger holes, and a plurality of target bowling balls, together with

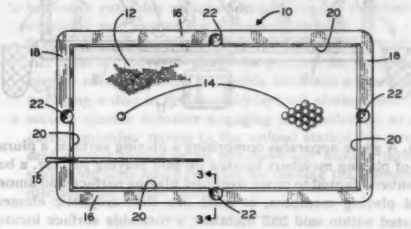
a pair of playing shoes worn by each of the players who bowl the cue ball at the target balls, each of said playing shoes fitted with a heel and sole platform of a height which is greater than the radius of the cue ball or the target balls.

3,976,294

GAME TABLE

Damian G. Maldonado, 1808 Jenning St., Mendota, Calif. 93640

Filed May 12, 1975, Ser. No. 576,551
Int. Cl.² A63D *15/00*
U.S. Cl. 273—3 A **4 Claims**



1. An improved pool table of an oblong, substantially rectangular configuration on which is played a game requiring small balls to be driven one against another through a manipulation of a cue, consisting of:

a substantially rigid, uninterrupted fabric-covered playing surface disposed in a substantially horizontal plane, a first pair of elevated rails extended in spaced parallelism along opposite sides of said surface, and a second pair of elevated rails extended in spaced parallelism across the opposite ends of the surface in orthogonal intersecting relation with said first pair of rails, precisely four pockets defined at the midportions of said rails and disposed in direct communication with said surface and substantially bisected by orthogonally related axes of symmetry for said surface, and a rebound cushion extended along said rails between said pockets.

3,976,295

GAME BALL

Jesse H. Heald, Jr., Tullahoma, Tenn., assignor to Lannom Manufacturing Company, Inc., Tullahoma, Tenn.

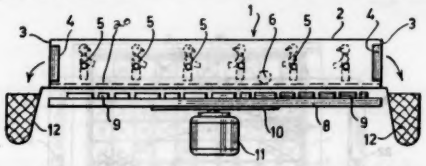
Continuation of Ser. No. 487,203, July 10, 1974, abandoned. This application Feb. 20, 1976, Ser. No. 659,705
Int. Cl.² A63B *37/00*
U.S. Cl. 273—60 R **15 Claims**

1. A composite ball having the appearance, physical characteristics and dimensions of a conventional baseball including a cork and rubber center, yarn windings, and a leather cover comprising a spherical core member formed of flexible and resilient molded polyurethane foam and a cover portion comprising a leather member stitched over and enclosing said core member wherein said core member is formed of polyurethane foam of such density and resilience as to give said composite ball essentially the same rebound qualities, hardness, size, feel and sound as said conventional baseball so as to be usable in organized league play of baseball under the rules of baseball.

3,976,296
MAGNETIC GAME APPARATUS

Robert A. Smith, c/o Henry R. Smith, 3617 Mary Ave., Baltimore, Md. 21206

Filed Dec. 2, 1974, Ser. No. 528,724
Int. Cl.² A63F 7/06
U.S. Cl. 273—85 A 2 Claims

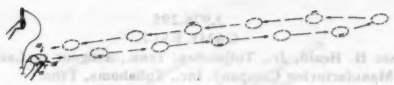


1. A game apparatus comprising a playing surface, a plurality of playing members located on said playing surface, a ball member adapted to move over said playing surface and among said playing members, at least one first magnetic element located within said ball member, a rotatable surface located adjacent to and below the playing surface, said rotatable surface carrying a plurality of second magnetic elements, said second magnetic elements being capable of exerting magnetic forces upon the first magnetic element within the ball, whereby movement of said rotatable surface beneath said playing surface provides means for randomly positioning said ball member on the playing surface.

3,976,297
RETURNING TETHERED DISC

William D. Seymour, 1100 NE. 160th St., North Miami Beach, Fla. 33162

Filed June 27, 1975, Ser. No. 591,132
Int. Cl.² A63B 71/00
U.S. Cl. 273—95 A 11 Claims



1. A flying toy comprising, in combination,
A. a generally disc shaped device including,
1. a top wall and
2. a peripheral downwardly extending skirt, defining a generally inverted saucer configuration, and
3. an axially extending hole through said top wall;
B. an elongated line having a first end and a second end said first end comprising a loop loosely attached to said disc shaped device, through said axial hole; and an end zone extending from said second end towards said first end; and
C. control means including a first portion and a second portion, said end zone of said line being attached to said second portion.

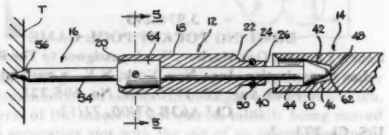
9. A flying toy as defined in claim 1 wherein a net assembly is provided, said net assembly comprising a target, including a pair of vertically mounted, spaced apart poles and a pair of horizontal, spaced apart web members spanning the distance between the poles.

3,976,298
DART

LeRay V. Hinchman, 2622 Carnegie Lane, Redondo Beach, Calif. 90278

Filed June 16, 1975, Ser. No. 587,326
Int. Cl.² A63B 65/02
U.S. Cl. 273—106.5 R 16 Claims

12. A hand propelled projectile comprising:
a. an elongate body member comprised of:
1. a fore body section having a forward end and a rearward end,
2. a first coupling element at the rearward end of said fore body section,
3. means forming a central bore in said fore body section,
4. an aft body section having a forward end and a rearward end, and having a second coupling element at the forward end of said aft body section, and capable of being in coupling engagement with said first coupling element so that said fore body section is in retentive, but removable, engagement with said aft body section,
b. a pin section comprised of:
1. a main shaft,
2. a pointed end on one end of said main shaft capable of being propelled into a garget or like member,
3. an enlarged head on the opposite end of said shaft with respect to said pointed end and being disposed in retentive, but removable, coupling arrangement with a portion of said second coupling element when said first coupling element is in coupling engagement with said second coupling element,
4. said main shaft extending through the central bore in said fore body section and said fore body section being



shiftable with respect to said shaft when said pointed end engages a relatively hard surface causing disengagement between said first coupling element and second coupling element to permit separation of said aft body section from said fore body section.

14. A method of using a projectile of the type projected by manual action into a target or like member, and which projectile comprises a fore body section and an aft body section connectable to said fore body section with a shaft extending through said fore body section and having a pointed end thereon, said method comprising:
a. propelling said projectile toward said target or like member,
b. causing an impact between said target or like member and a pointed end on said shaft,
c. causing an enlarged head on said shaft opposite to said pointed end to shift and impact within a recess in said aft body section thereby causing an initial impact separation between said fore body section and said aft body section of said projectile upon impact, and
d. causing an inertial complete separation between said fore body section and said aft body section after said initial impact due in part to inertial movement of the then separated fore body section.

3,976,299
GOLF CLUB HEAD APPARATUS

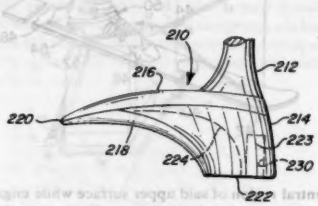
Philip E. Lawrence, 17434 N. 21st Drive, and Boris M. Plesinger, 36 W. Moon Valley Drive, both of Phoenix, Ariz. 85023

Filed Dec. 16, 1974, Ser. No. 533,237
Int. Cl.² A63B 53/04
U.S. Cl. 273—171 5 Claims

1. Golf club head apparatus, comprising, in combination:
a face having an upper portion and a lower portion;
sole means extending rearwardly from the lower portion of the face;

an inner side portion and an outer side portion extending rearwardly from and adjacent to the face and upwardly from the sole means;

a substantially continuous convex surface extending rearwardly from the upper portion of the face and inwardly from the inner and outer side portions and forming the upper surface of the club head;



a concave surface, including an inner recess between the inner and outer side portions, extending substantially continuously upwardly and rearwardly from the sole means to the convex surface, the juncture of the convex surface and the concave surface defining an edge, said edge extending in a curve between the outer side portion and the inner side portion; and

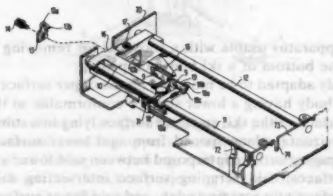
weight means disposed in the head adjacent the inner and outer side portions for adjusting the balance of the club head.

3,976,300

LOADER CARRIER MECHANISM

James Dudley Bruer, Leander, Tex., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 17, 1975, Ser. No. 559,352
Int. Cl.² G11B *15/00*
U.S. Cl. 274—1 R **4 Claims**



4. Apparatus for concurrently transferring a first disc from the record/playback station into the unload station and transferring a second disc from the load station into the record/playback station of a disc dictation system comprising:

a carrier member of molded unitary construction slidably mounted for translation from a home position to a load-/eject position in a plane parallel to the surface of said discs, said carrier member including an integral recess extending in a plane perpendicular to its plane of translation;

a picker for selecting the bottom one of a stack of discs from the load station of said discs dictation machine, said picker including a finger having an elongated, ramp-shaped first surface, a second surface less than a disc thickness above said first surface, and a relief connecting said first and second surfaces at an angle equal to the curvature of the edge of said disc, and a base member integral with said finger, said base member being formed to fit said recess in said carrier member and having an elongated aperture therein extending parallel to the axis of said recess for coarsely adjusting said ramp-shaped surface of said finger to engage the bottom of said stack of discs;

means for attaching said picker to said carrier member;

ejector means for transferring a disc from the record/playback station to the unload station of said disc dictation machine moveably attached to said carrier member through guide slots in the body thereof, said guide slots comprising upper and lower elongated apertures parallel to the plane of translation of said carrier member and connected by a ramp-shaped center aperture;

a bellcrank rotatably attached to said carrier member and engaging said ejector for movement thereof;

a first ejector actuator engaging said bellcrank as said carrier member moves to the home position for moving said ejector means through said guide slots into a position for engaging a disc in the record/playback station; and

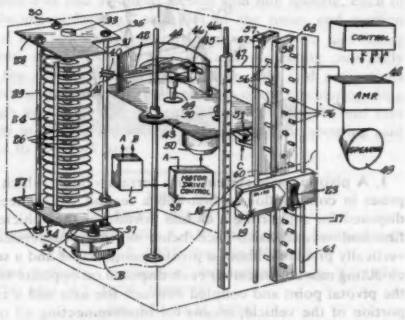
a second ejector actuator engaging said bellcrank as said carrier member moves to the unload station for moving said ejector means in an out-down-out motion through said guide slots into a position for feeding the transferred disc into the output station.

3,976,301

RECORD SELECTOR MECHANISM FOR A PHONOGRAPH SYSTEM

Michael J. Corbett, North Tonawanda, and Alvin S. Topolski, Tonawanda, both of N.Y., assignors to The Wurlitzer Company, Chicago, Ill.

Filed Mar. 3, 1975, Ser. No. 554,583
Int. Cl.² G11B *17/22*
U.S. Cl. 274—10 D **11 Claims**



1. In a phonograph system, the combination comprising: a plurality of spaced-apart record means to be individually selected and played, transducer means for engagement with a selected one of said plurality of spaced-apart record means, transport means coupled to said transducer means for moving said transducer means from one selected record means to another selected record means, drive means for simultaneously driving all of said record means within said plurality of record means at a playing speed, whereby only the selected one of said plurality of record means is reproduced, selector means for providing random selection of the record means to be reproduced, and sensing means responsive to said selector means and engageable with said transport means for stopping said transport means when at a position corresponding to the selected record means, said selector means including a plurality of spaced-apart indicia-bearing elements formed on said phonograph, a movable member movable along said elements for positioning adjacent a selected one of said plurality of spaced-apart indicia-bearing elements to represent a selected one of said plurality of record means, and actuator means mounted on and movable with said selector means for manipulation by an operator for cooperating with said transport means to position said transducer means adjacent the selected

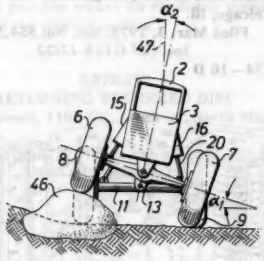
record means for playing said record means being disk-shaped and having apertures formed substantially centrally thereof, coupling means positioned within the apertures of said disk-shaped records, and alignment means associated with said coupling means for maintaining the axis of rotation of said disk-shaped records substantially in alignment, said coupling means including a circular cup-shaped member having annular sidewalls and a bottom wall, and a post extending from said bottom wall substantially axially of said sidewalls and protruding beyond the edges of said sidewalls, an apertured plate located over said post and extending radially outwardly therefrom to overlie said annular sidewall biasing means positioned between said bottom wall and said apertured plate for urging said apertured plate away from said bottom wall, said post being dimensioned to receive the aperture formed within said disk-shaped record, and pressure means overlying said apertured plate and said post to capture said disk-shaped therebetween.

3,976,302

PIVOTING AXLE SYSTEM FOR TERRAIN VEHICLES

Sten Ove Hammarstrand, Fiskebyvagen 14, 824 00 Hudiksvall, Sweden

Filed Dec. 4, 1974, Ser. No. 529,476
Claims priority, application Sweden, Dec. 7, 1973, 7316596
Int. Cl.² B60G 17/04
U.S. Cl. 280—6 H **6 Claims**



1. A pivoting axle system for a terrain vehicle which comprises in combination, a first and a second rigid wheel axle disposed for supporting a chassis portion of the vehicle, said first and second axles each being centrally suspended and vertically pivotable about a pivotal point, a first and a second co-acting movable member each disposed on opposite sides of the pivotal point and coupled between the axle and a chassis portion of the vehicle, means for interconnecting all of said co-acting movable members to a control means for controlling operation of each co-acting movable member on the first rigid wheel axle relative to a correspondingly disposed co-acting movable member on the second rigid wheel axle, said first axle being caused to oppositely pivot relative to said second axle by interconnection of the co-acting members.

3,976,303

BOOT SCRAPER FOR SKIIS

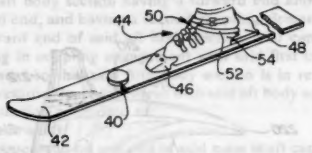
Christopher B. Lillibridge, 29 Ridgewood Drive, Norwich, Conn. 06360, and Alfred H. Lotring, R.D. No. 1, Lord's Point, Stonington, Conn. 06378

Filed June 6, 1975, Ser. No. 584,591
Int. Cl.² A63C 11/00, 11/18
U.S. Cl. 280—11.37 E **13 Claims**

1. Apparatus usable with a snow ski for removing material from the bottom of a ski boot comprising:

a body adapted to be mounted on the upper surface of a ski;

said body having a lower surface conformable to the upper surface of the ski, an upper surface substantially planar horizontally spaced from said lower surface, and a scraping surface interposed between said lower and upper surfaces, said scraping surface intersecting said upper surface at a scraping edge, said scraping surface and said scraping edge being conformed such that the magnitude of a horizontal projection of said scraping surface presented to a ski boot as the boot is moved toward and across



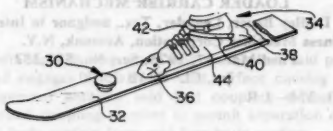
a central region of said upper surface while engaging said scraping edge is substantially uniform regardless of the direction of movement in azimuth of the boot relative to said body.

3,976,304

SKI BOOT SCRAPER

Christopher B. Lillibridge, 29 Ridgewood Drive, Norwich, Conn. 06360, and Alfred H. Lotring, R.D. No. 1 Lord's Point, Stonington, Conn. 06378

Filed June 6, 1975, Ser. No. 584,612
Int. Cl.² A63C 11/00, 11/18
U.S. Cl. 280—11.37 E **20 Claims**



1. Apparatus usable with a snow ski for removing material from the bottom of a ski boot comprising:

a body adapted to be mounted on the upper surface of a ski;

said body having a lower surface conformable to the upper surface of the ski, an upper surface lying in a substantially horizontal plane spaced from said lower surface, and a scraping surface interposed between said lower and upper surfaces, said scraping surface intersecting said upper surface at a scraping edge, and said lower surface having a surface area smaller than said upper surface.

3,976,305

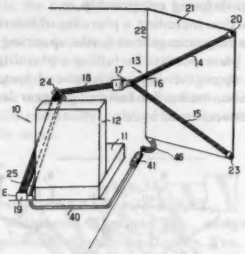
SAFETY BELT ASSEMBLY FOR A MOTOR VEHICLE

Walter Fieni, Paris, France, assignor to Societe Anonyme Francaise du Ferodo, Paris, France

Filed Jan. 26, 1972, Ser. No. 220,809
Claims priority, application France, Feb. 3, 1971, 71.03591
Int. Cl.² B60R 21/02
U.S. Cl. 280—744 **8 Claims**

1. A safety belt assembly for use in a motor vehicle having a seat and a door hinged to a vehicle frame comprising: a seat belt having a generally Y-shaped configuration with a common strap anchored at one end thereof to an inboard structural portion of the vehicle frame, a shoulder strap and a transverse strap secured to the rearward free edge portion of said door at two vertically spaced points thereon and to said common strap at a second end thereof variable length means secured at one end to a second inboard portion of the vehicle frame and attached at its other end to an intermediate portion of said common strap for displacing such common strap away

from said seat in response to the opening of said door and toward said seat in response to the closing of said door, and



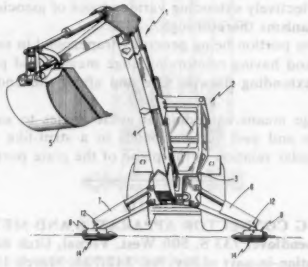
means for controlling said last mentioned means responsive to the opening and closing of said door.

3,976,306

ATTACHMENT FOR GROUND-ENGAGING PADS OF STABILIZERS

Harold Nault, 48 Beau St., Norwalk, Conn. 06880

Filed Feb. 26, 1975, Ser. No. 553,328
Int. Cl.² B60S *9/00*; B66C *23/80*
U.S. Cl. 280—763 **4 Claims**



1. An attachment for ground-engaging pads of stabilizer arms of material-handling apparatus, comprising said ground-engaging plate having an opening, said ground-engaging plate having at least one bracket projecting therefrom and being adapted to be pivotally conected to the free end of a stabilizer arm, and attachment having a projecting portion adapted to extend through said opening toward said stabilizer arm, and retaining means adapted to be operatively and removably mounted on said projecting portion for maintaining said attachment in operative position on said plate, the ground-engaging characteristics of the ground-engaging pad being substantially different when said attachment is operatively mounted thereon; said attachment comprises a main member having said projecting portion and a first slot, said plate having a second slot, said first and second slot interdigitate with each other when said main member is mounted on said plate.

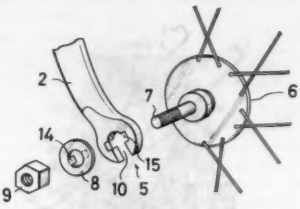
3,976,307

MEANS FOR PREVENTING THE DETACHMENT OF THE FRONT WHEEL FROM A BICYCLE

Noriyuki Ogisu, Tokyo, Japan, assignor to Nichibei Fuji Cycle Co., Ltd., Tokyo, Japan

Filed Apr. 1, 1975, Ser. No. 563,977
Int. Cl.² B62K *25/00*
U.S. Cl. 280—279 **1 Claim**

1. A front fork assembly for a bicycle including a front fork and a bicycle front wheel for preventing the detachment of said front wheel from said front fork, said front fork comprising a pair of elongated laterally spaced fork arms each having a free end, each said fork arm having an open-ended slot extending into said fork arm in the elongated direction thereof from the free end thereof, said front wheel having a hub spindle arranged to fit into and extend through said open-ended slot, said hub spindle comprising a threaded circular exterior surface located within and extending through said open-ended slot, means for securing said front wheel in said front fork comprising hub nuts and washers, each said washer having a circular opening therethrough for closely fitting about said circular surface of said hub spindle, said washer having a first surface arranged to face toward said front wheel when it is mounted in said front fork and an oppositely directed second



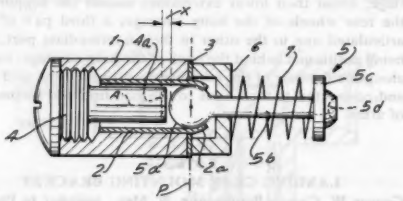
surface, said slot having a pair of facing surfaces extending inwardly from the free end of said fork arm with said first facing surfaces being spaced apart by the diametrical dimension of said hub spindle so that said hub spindle can be passed through said slot between said facing surfaces, said slot having an inner end portion located at the opposite end thereof from the open end and arranged to seat said hub spindle, each of said facing surfaces of said slot at the inner end portion thereof having cutouts extending outwardly from said facing surfaces, projections formed on and projecting outwardly from the first surface of said washer, and said projections located on diametrically opposite sides of the circular opening through said washer and being shaped to formfit into said cutouts in said facing surfaces of said slot for securing said washer to said fork arm.

3,976,308

SAFETY SKI BINDING

Hans Napflin, Kastanienallee 5, 6375 Beckenried, Switzerland

Filed July 2, 1975, Ser. No. 592,662
Claims priority, application Switzerland, July 2, 1974, 9083/74; Mar. 12, 1975, 3099/75
Int. Cl.² A63C *9/08*
U.S. Cl. 280—626 **10 Claims**



1. A clamp for a ski binding, said clamp comprising:
a housing adapted to be secured to a ski and formed with a part-spherical seat;
a pin having at one end a ball head swivelable in said seat on said head;
an abutment surface on said housing lying in a plane passing substantially through the center of curvature of said seat;
a pressure element slidable on said pin and having one end face engageable against said surface, said pin having an opposite end engageable with the toe of a skiboot; and

a spring compressed between said pin and said opposite end for pressing said element against said surface away from the toe of the skiboot.

3,976,309

REDUCIBLE VOLUME STRUCTURE, PARTICULARLY SUITABLE FOR BABY CARRIAGES

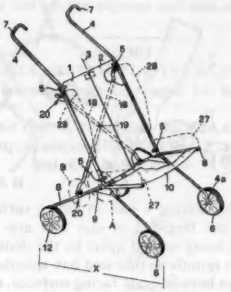
Enea Montanelli, Quarto Inferiore, Bologna, Italy

Filed Aug. 6, 1975, Ser. No. 602,364

Claims priority, application Italy, Dec. 10, 1974, 3558/74; Apr. 10, 1975, 3377/75

Int. Cl.² B62B *7/02*

U.S. Cl. 280—644 **10 Claims**



1. A reducible volume structure, particularly suitable for baby carriages, essential features of which are that it comprises: a pair of flat rigid members that constitute the back of the baby carriage, these being fastened to each other by means of a hinge on one adjacent side in such a way as to allow them to adopt either a stable, roughly co-planar position or else a position in which they are side by side; a first pair of arms, each arm situated at a point corresponding to where the sides of the flat members opposite the sides hinged to one another are located, these being connected to the said flat members in a way which can allow the latter to rotate with respect to the said arms; the arms of the said first pair being shaped in such a way that their lower extremities sustain the supports for the front wheels of the baby carriage and that their upper extremities, each of which provided with a handle, serve for steering or carrying the baby carriage; a second pair of arms arranged externally at the side of the arms of the first pair and articulated to them so as to provide with their upper furthermost parts, members with which to support a seat in the baby carriage, whilst their lower extremities sustain the supports for the rear wheels of the baby carriage; a third pair of arms articulated one to the other in their intermediate part, these being positioned behind the back of the baby carriage, roughly alongside the pair of flat members constituting the said back, and connected at their ends to the said first and second pair of arms.

3,976,310

LANDING GEAR MOUNTING BRACKET

George W. Carr, Albuquerque, N. Mex., assignor to Pullman Incorporated, Chicago, Ill.

Filed June 19, 1975, Ser. No. 588,541

Int. Cl.² B60S *9/08*

U.S. Cl. 280—766 **3 Claims**

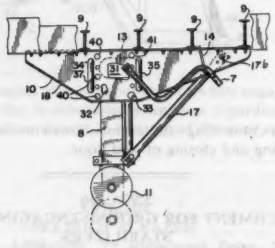
1. For a semi-trailer having an underframe and a landing gear including a pair of laterally spaced vertical landing gear legs, an attachment means for securing each gear leg to the trailer underframe, comprising:

a vertical gusset including a vertical plate portion couplable with the gear leg and a generally horizontal flange extending from the top of said plate portion,

said upper flange including a stress-distributing bend portion joining with the top of said plate portion and an attachment portion having means for attachment to the trailer underframe and being joined to the bend portion in a corner-defining relationship,

said bend portion including a plurality of laterally and vertically extending strengthening ribs spanning the corner,

said vertical plate portion including a plurality of vertically extending strengthening beads spaced lengthwise of the plate portion, means for fastening a gear leg to the plate portion between said beads,



said vertical plate portion having a crank clearance aperture located between the strengthening beads and said beads being spaced sufficiently far apart so that the crank clearance aperture may be of desired configuration and size for selectively extending various types of associated gear mechanisms therethrough,

said plate portion being generally trapezoidal in side elevation and having reinforcing edge means, said plate portion extending flatwise fore and aft of the underframe, and

said edge means extending at acute angles to said upper flange and said vertical beads in a strut-like mutually triangular relation in the plane of the plate portion.

3,976,311

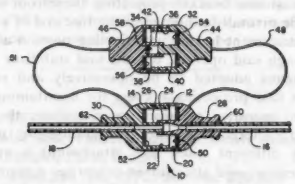
TUBING CONNECTOR APPARATUS AND METHOD

Ray E. Spendlove, 733 S. 500 West, Vernal, Utah 84078

Continuation-in-part of Ser. No. 342,724, March 19, 1973, abandoned. This application Oct. 15, 1974, Ser. No. 514,360

Int. Cl.² F16L *25/00*, *47/00*

U.S. Cl. 285—12 **13 Claims**



10. A tubing connector comprising:

a first coupling comprising a diametrally enlarged housing, a coaxial first stub tube within the housing, the coupling having an axial bore accommodating attachment of the first coupling to one fluid conduit so as to provide fluid communication between the one fluid conduit and the first stub tube;

a second coupling comprising a diametrally enlarged housing, a coaxial second stub tube within the housing, the second coupling having an axial bore accommodating attachment of the second coupling to one other fluid conduit so as to provide fluid communication between the other fluid conduit and the second stub tube, each of

the couplings having an annular space separating the stub tube from the housing;

a first closure tethered to the first coupling and comprising a cap mateable with the first housing and a coaxial stopper within the cap, the stopper being adapted to plug the first stub tube; and

a second closure tethered to the second coupling and comprising a cap mateable with the second housing and a coaxial stopper within the cap, the stopper being adapted to plug the second stub tube, the first and second closures having dimensionally configurated housings which telescopically mate.

3,976,312

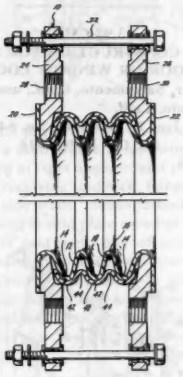
EXPANSION JOINT

Burleigh R. Murphree, Houston, Tex., assignor to Peabody Dore' Corporation, Fort Bend County, Tex.

Filed Aug. 22, 1975, Ser. No. 606,900

Int. Cl.² F16L *11/12*

U.S. Cl. 285—45 **1 Claim**



1. An expansion joint comprising,

a first flexible corrugated tubular member including a plurality of ridges and valleys and having connecting means at each end for connection to conduits,

a second flexible corrugated tubular member sized to encircle the exterior of the first tubular member and having a plurality of ridges and valleys mating with the ridges and valleys of the first member,

said second tubular member being shorter than the first member and having its ends open and being supported by the first member whereby said second member may accommodate movement of the first member but is not directly subjected to conduit movement, and whereby leaks in the first member is deflected by the second member out of the open ends of the second member, and

said second member is transparent whereby leaks in the first member may be visually observed.

3,976,313

LAUFFEN SAFETY LOCKING DEVICE FOR A COUPLING

Robert F. Lauffenburger, Warren, and Edmund H. Waszkiewicz, Erie, both of Pa., assignors to Edmund H. Waszkiewicz, Erie, Pa.

Filed June 13, 1975, Ser. No. 577,367

Int. Cl.² F16L *37/18*

U.S. Cl. 285—84 **2 Claims**

1. In combination, a separable coupling and a safety lock,

said coupling comprising a hollow plug member having an external peripheral groove therein,

a hollow female socket member receiving said hollow plug member,

a seal means in said hollow female member adapted to engage said plug member forming a seal therebetween,

elongated levers rotatably supported on said female member said levers having cam means adapted to engage said peripheral groove in said plug member for urging said plug into sealing engagement with said seal,

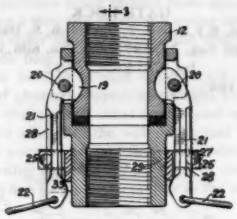
a bracket,

said bracket having two spaced ears,

a flange connecting said ears together,

means extending through said flange removably fixing said bracket to a side of said female member,

a counterbored hole in each said ear with a detent ball therein,



said balls extending into the space between said ears,

one of said levers being adapted to swing into said space between said ears,

said detent balls overlying and engaging the external surface of said lever whereby said lever is restrained from moving with said cam to disengage said plug,

two leaf springs,

each said leaf spring being adapted to rest on the outside of a said ear overlying said counterbored openings therein engaging said detent ball, and

a screw extending through each said spring and threadably engaging said ear,

clamping said spring to said bracket whereby said detent balls are urged into said opening.

3,976,314

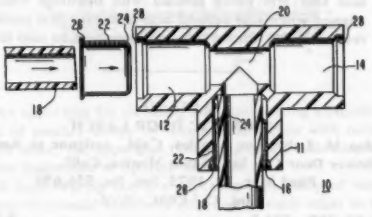
TUBE COUPLER

Charles H. Graham, Los Altos Hills, Calif., assignor to Paul M. Hankison, Canonsburg, Pa.

Filed Jan. 3, 1975, Ser. No. 538,503

Int. Cl.² F16L *33/22, 47/00*

U.S. Cl. 285—238 **5 Claims**



1. A coupler for a ductile tube comprising:

a. a body having at least two generally cylindrical ports therein;

b. a generally cylindrically-shaped thin-walled ferrule, said ferrule having a substantially uniform wall thickness throughout the entire length thereof and insertable within at least one port of said body, the outside surface of said

ferrule forming a snug, friction fit with the port wall to sealingly engage the port wall;

c. said ferrule having a single radially-inward flaring continuous circumferential lip at the inner extremity thereof, and a radially-outward flaring continuous circumferential lip at the outer extremity thereof;

d. said radially-outward flaring lip biting into the port wall when inserted therein to retain it in place and prevent dislocation therefrom; and

e. said radially-inward flaring lip biting into the exterior surface of the tube when inserted therein, said lip locking the tube within said body and providing a fluid seal between the tube and said body.

3,976,315

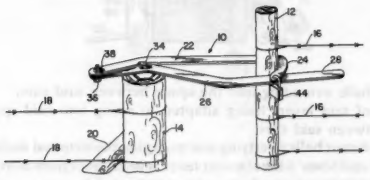
GATE LOCK

Louis G. Braun, R.F.D. No. 1, Spearfish, S. Dak. 57783

Filed Aug. 21, 1975, Ser. No. 606,353

Int. Cl.² E05C *19/12*

U.S. Cl. 292—104 **4 Claims**



1. A gate lock for locking a gate post to a fence post comprising:

a. a first arm, and means for mounting said first arm on a fence post for rotational movement relative thereto,

b. a second arm having a curved end portion adapted to extend around said gate post, and

c. means for pivotally connecting adjacently disposed end portions of said first and second arms to permit movement of said second arm relative to said first arm so as to permit movement of said curved end of said second arm between a first position enclosing said gate post and a second position free of said gate post to permit opening of said gate,

d. the curved end of said second arm and the free end of said first arm being formed with openings which are aligned when said second arm is in said first position to receive a lock for locking said gate post to said fence.

3,976,316

MAGNETIC DOOR LATCH

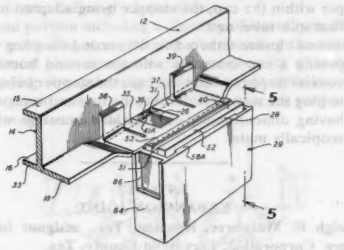
Jordan M. Laby, Los Angeles, Calif., assignor to American Shower Door Co., Inc., Santa Monica, Calif.

Filed Mar. 10, 1975, Ser. No. 556,675

Int. Cl.² E05C *19/16*

U.S. Cl. 292—251.5 **8 Claims**

1. A catch for a door butting against a stop having an indented section and comprising a magnet, a magnet holder, means securing the magnet holder to the stop at the indented section thereof; a contact face on the magnet, magnet restraint walls and a magnet registry edge defining the periphery of the magnet; said magnet holder having a plurality of walls defining a restraint cavity, and a rear registry ridge which engages the magnet registry edge, and opposed resilient side restraints adapted to engage the magnet restraint walls and to pass the magnet registry edge such that the magnet contact



face has freedom to align with the door to adhere magnetically thereto.

3,976,317

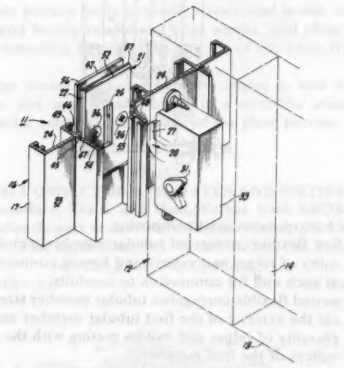
STRIKE PLATE CONSTRUCTION FOR SLIDING GLASS DOOR OR WINDOW LOCK

John Philip Collier, Sacramento, Calif., assignor to Blomberg Glass, Sacramento, Calif.

Filed Jan. 2, 1976, Ser. No. 646,250

Int. Cl.² E05C *3/16*

U.S. Cl. 292—340 **7 Claims**



1. In combination with a sliding glass door or window having a lock stile with a lock and latch hook having a horizontal limb and a vertical limb movable between a first position removed from the outer face of a metal lock jamb having an outer face and an inner face, a second position in which the lock style and the lock are in close juxtaposition to the lock jamb and the vertical limb of the latch hook projects at least partially through an opening in the lock jamb, and a third position in which the latch hook is located vertically above said second position, a strike plate construction comprising:

a. a vertically elongated metal strike plate having a front face and a back face, an upper end, a lower end and a pair of side edges, said plate having a central aperture; and,

b. a pair of screws passing through a pair of screw holes straddling said central aperture, said screw holes being located in a horizontal plane intercepting said central aperture, said screws securing said back face of said strike plate to said outer face of said lock jamb with said central aperture in said strike plate in register with at least a portion of said opening in said lock jamb,

said vertical limb of said latch hook being in register with and projecting through said central aperture in said strike plate in said second position,

said vertical limb of said latch hook being in face to face engagement with said back face of said strike plate in said third position to prevent movement of the door or window toward said first position.

3,976,318

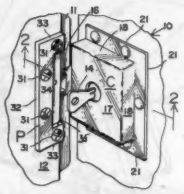
BURGLAR-PROOF LOCK PROTECTOR

Joseph W. Krus, 1301 NE. Miami Gardens Drive, Apt. 1024W, North Miami Beach, Fla. 33179

Filed Sept. 22, 1975, Ser. No. 615,417

Int. Cl.² E05B *17/00*

U.S. Cl. 292—346 **3 Claims**



1. A burglar-proof protecting device for a lock mounted on a door hinged to a door frame comprising a plate member, side walls extending at right angle to said plate member forming a chamber for receiving said lock, flanges extending along the edges of said side walls, means fastening said flanges to said door, an opening in said plate member for exposing a key receiving porton of said lock, one of said side walls being positioned in substantially parallel and spaced relation to said door frame and plate means secured to said door frame and extending about said device and spanning said space between said door frame and said device preventing the insertion of a tool into said space for the purpose of opening said door without a key.

3,976,319

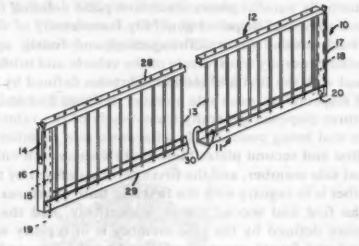
TOBACCO RACK

Arthur Lee Perry, 118 S. Carolina St., Goldsboro, N.C. 27530

Filed Nov. 12, 1975, Ser. No. 630,969

Int. Cl.² A24B *1/08*

U.S. Cl. 294—5.5 **6 Claims**



1. A rack for supporting a mass of tobacco leaves for facilitating transporting and curing the leaves, said rack comprising:

a. A first rack element substantially U-shaped with a base portion and two arm portions, said base portion and said arm portions being formed of square steel tubing,

b. Said base portion having uniformly spaced perforations along the length thereof, elongated piercing rods extending from each of said uniformly spaced perforations in the same direction and parallel to said leg portions,

c. Each of said piercing rods having one end disposed in said uniformly spaced perforations and attached to said base portion, the other ends of said piercing rods being sharpened to a point, said piercing rods and said arm portions being of different lengths,

d. Said arm portions each being affixed to said base portion at one end thereof with the other free end terminating in an angled plane formed by a 45° sloped end, said 45° sloped end forming a guide means at the free end of each arm portion,

e. Said base portion having ends formed in a 45° angled slope to form a cooperating part of a latching mechanism, and

f. A second rack element comprised of a base portion and two leg portions, one each extending from each end of said base portion, to form a U-shape,

g. Said leg portions being formed from square steel tubing and having a free end carrying a spring latch mechanism along the outer surface thereof, the other end being affixed to the base portion,

h. said base portion of said second rack element being formed of channel shaped lightweight steel of such dimensions that the said other ends of said leg portions rest on and are affixed to the web of the said base portion,

i. Said arm portions of said first rack element being telescoped within the said leg portions of said second rack element when the tobacco rack is in the assembled position,

j. Said spring latch mechanism cooperating with the sloped ends of said base portion of said first rack element to resiliently hold the tobacco rack in its assembled condition.

3,976,320

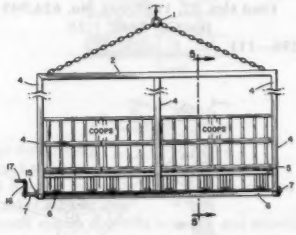
CHICKEN COOP LIFTING DEVICE

John H. Holladay, Winterville, and Albert D. Shackelford, Athens, both of Ga., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Aug. 14, 1975, Ser. No. 604,851

Int. Cl.² B66C *1/16*

U.S. Cl. 294—67 R **1 Claim**



1. An apparatus for elevating and transporting a plurality of stacks of poultry coops by mechanical means with minimal manual labor, the apparatus consisting of the following components assembled to operate as a unit:

a. A load-bearing frame comprising a plurality of vertical and horizontal members attached to each other to form substantially a rectangular table-like structure having two parallel rows of legs to straddle a plurality of stacks of poultry coops when said coops are stacked one coop in depth and more than one coop in height and width,

b. a plurality of lift tines for grasping, positioning, and securing the stacks of coops during the elevating and transporting operations, said tines being actuated by an pivoting about a tine shaft to which each of two rows of tines is secured, one row of tines being on each shaft,

c. a tine-activating assembly secured to the load bearing frame at one end to provide automatic disengagement of the lift tines to free all coops at the end of each transporting operation, and

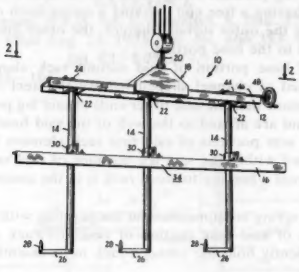
d. a means of lifting the load bearing frame when fully loaded.

3,976,321

SHEET MATERIAL HANDLING APPARATUS

George A. Dean, Kansas City, Mo., assignor to Dean Research Corporation, Kansas City, Mo.

Filed Feb. 21, 1975, Ser. No. 551,910
Int. Cl.² B66C 1/48
U.S. Cl. 294—81 R 16 Claims



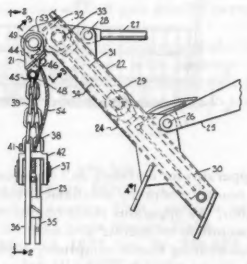
1. Sheet material handling apparatus comprising: a header unit, a plurality of rods mounted for rotation in said header unit, means on each of said rods for engaging said sheet material at one end thereof, said means comprising a U-shaped member for gripping the end of the sheet material to be handled and other means slidably mounted on said rods for engaging the other end of said sheet material.

3,976,322

SELF-ALIGNING GRAPPLE SWIVEL

Norman Allen Johnson, 5325 Tenth Ave., South Delta, British Columbia, Canada

Filed Oct. 22, 1975, Ser. No. 624,949
Int. Cl.² B66C 1/28
U.S. Cl. 294—111 16 Claims



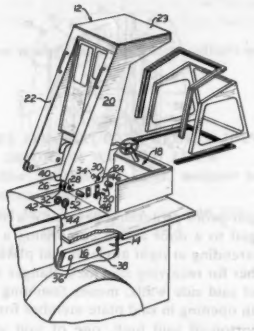
1. In combination with a grapple and manipulating means, a self-aligning swivel apparatus having upper and lower portions interconnected for relative angular motion by pivot means having a pivotal axis, said pivotal axis inclined toward a self-aligned position of said grapple with respect to said manipulating means, said upper portion interconnected to said manipulating means, said grapple interconnected to said lower portion in radial spaced relation from said pivotal axis, a substantially vertical axis passing through the center of gravity of said grapple intersecting said pivotal axis when said grapple is in said self-aligned position.

3,976,323

CAB MOUNTING STRUCTURE

William H. Godfrey, Aurora, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Continuation of Ser. No. 408,666, Oct. 23, 1973. This application Apr. 10, 1975, Ser. No. 566,650
Int. Cl.² B62D 25/06
U.S. Cl. 296—102 1 Claim

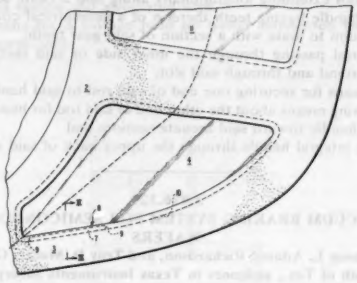


1. In a vehicle having a frame including a pair of elongated generally horizontal side members and an operator station adjacent said pair of side members, the improvement which comprises a protective structure having first and second generally upwardly extending members having a solid roof portion fixed to said upwardly extending members adjacent the upper ends thereof and positioned generally over the operator station with the protective structure so attached to said frame, door means supported by and disposed between the first and second upwardly extending members permitting access to the operator station, window means positioned beneath the roof portion and encompassing the operator station, each upwardly extending member at its lower end comprising first and second substantially parallel plates, each first plate defining first and second apertures disposed generally transversely of the vehicle, each second plate defining third and fourth apertures disposed generally transversely of the vehicle and substantially aligned with the first and second apertures defined by the first plate respectively, each side member defining first and second apertures disposed generally transversely of the vehicle, each lower end being positionable adjacent a side member so that the first and second plates thereof are disposed on either side of that side member, and the first aperture defined by that side member is in registry with the first and third apertures defined by the first and second plates respectively, and the second aperture defined by the side member is in registry witht the second and fourth apertures defined by the first and second plates respectively, removable pin means positionable through each set of three registered apertures on either side of the vehicle generally transversely of the vehicle, said removable pin means comprising a plurality of single threadless pins, each positionable in a set of three registered apertures, to removably attach said protective structure to said frame, and pin securing means for each of said single pins comprising a locking plate bolted to the upwardly extending member and seatable in a slot defined in a pin to limit the motion of the pin relative to the upwardly extending member.

3,976,324
MOTOR VEHICLE WITH FOLDABLE TOP

Adolf Lehmann, Schonaich, Germany, assignor to Daimler-Benz Aktiengesellschaft, Germany

Filed May 30, 1974, Ser. No. 474,866
Claims priority, application Germany, May 30, 1973, 2327485
Int. Cl.² B60J 7/00
U.S. Cl. 296—107 7 Claims



1. A foldable top for a vehicle comprising a foldable roof covering having a rear downwardly sloping surface with laterally extending side surfaces; at least one flexible window means secured in said rear surface, said window means including at least one side portion extending in said side surfaces; retaining means fixed to the rear termination of said roof covering for supporting said rear termination; and reinforcement means disposed at said at least one side portion for reinforcing the area of said at least one side portion such that a predetermined fold configuration is provided at least at said side surfaces upon folding said roof covering, thereby preventing damage to said at least one side portion,

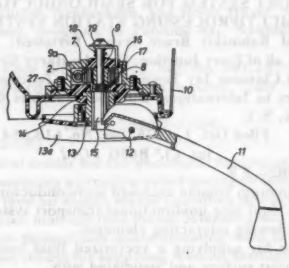
wherein said at least one portion of said window means includes two side windows disposed respectively at said surfaces, and

wherein said reinforcement means are secured along at least a portion of a lower edge of each of said two side windows.

3,976,325
CRANK DRIVE FOR TWO-WAY OPENABLE SLIDING ROOFS OF AUTOMOBILES

Walter Schätzler, Starnberg, Germany, assignor to Webasto-Werk W.Baier KG, Munich, Germany

Filed June 2, 1975, Ser. No. 582,936
Claims priority, application Germany, June 1, 1974, 2426765
Int. Cl.² B60J 7/02
U.S. Cl. 296—137 G 12 Claims



1. A crank drive assembly for a sliding roof mechanism of the kind used in automobile roofs, where a sliding roof panel is movable into and out of an opening in the stationary roof structure, under the action of a drive mechanism translating the rotating motion of a hand-operable crank into a movement of the sliding roof panel, the crank drive assembly comprising in combination:

a central drive shaft defining a rotational axis for the drive assembly and carrying a drive pinion which is at all times operatively connected to the drive mechanism for the sliding roof panel;

a rotatable drive crank connected to and carried by a hub, the connection between the hub and the drive crank including a pivot connection about which the drive crank is pivotable;

a drive connection between the hub and the drive pinion for transmitting to the pinion the rotational movements of the drive crank;

manually operable clutch means for selectively disengaging the drive connection;

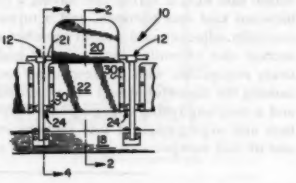
means for selectively arresting the drive pinion against rotational motion in response to the operation of the clutch means which disengages said drive connection; and

a recess in the stationary roof structure arranged and shaped in such a way that a portion of the drive crank is receivable therein, when the latter is pivoted about its pivot connection with the hub in the direction of said recess, thereby blocking the drive crank against rotation.

3,976,326
HINGE

Victor J. Grumblatt, Cape Canaveral, Fla., assignor to Lord Corporation, Erie, Pa.

Filed Aug. 6, 1975, Ser. No. 602,356
Int. Cl.² A47C 1/02
U.S. Cl. 297—333 8 Claims



1. A hinge comprising:

a. first bracket means;

b. second bracket means at least partially spaced from the first bracket means; and

c. viscoelastic means disposed between and secured to both bracket means to permit relative rotation between the first and second bracket means about a first axis that passes through said viscoelastic means and both bracket means,

at least one of the first and second bracket means including stop means engageable with the other of the first and second bracket means to prevent rotation of the first bracket means relative to the second bracket means about the first axis in one direction beyond a predetermined relative orientation of the two bracket means, relative rotation between said two bracket means when the stop means is engaging the other of the first and second bracket means occuring about a second axis spaced from the first axis and passing through a point of contact between the stop means and the other bracket means.

3,976,327

ADJUSTING ARRANGEMENT

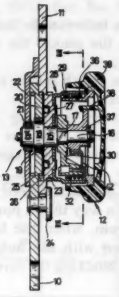
Egon Wirtz, Remscheid, and Karl Heinz Ligensa, Dabringhausen, both of Germany, assignors to Keiper KG, Remscheid-Hasten, Germany

Filed Jan. 28, 1975, Ser. No. 544,780

Claims priority, application Germany, Feb. 1, 1974, 2404815

Int. Cl.² B60N *1/06*

U.S. Cl. 297—366 5 Claims



1. In an adjusting arrangement, particularly for a vehicle seat, a combination comprising two strap members respectively connectable with a first element and a second element and being joined for relative movement; an inner and a cooperating outer gear annulus on the respective trap members; a brake sleeve on and movable with one of said strap members; a helical spring concentrically located within said brake sleeve and normally frictionally engaging an inner surface thereof, said spring having two circumferentially spaced inwardly angled end portions; an output member turnably mounted within said helical spring and having a first section extending between said end portions, and a turnable control member coaxially adjacent said output member and having a second section also extending between said end portions and selectively engageable with the respective end portions in a sense causing the diameter of said helical spring to become reduced; and a coupling spring engaging said output and control members and urging each of said sections into engagement with one of said end portions of said helical spring.

3,976,328

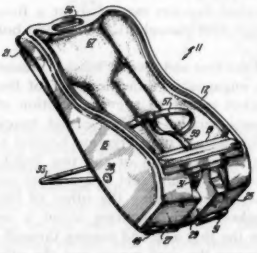
BABY CARRIER AND SEAT

Alwin J. Stahel, New Brighten, Minn., assignor to Questor Corporation, Toledo, Ohio

Filed Oct. 6, 1975, Ser. No. 620,061

Int. Cl.² A47D *1/00*

U.S. Cl. 297—377 5 Claims



1. A combination baby carrier and seat comprising

a molded plastic shell having a back, first sides and a seat;

a second pair of integral sides spaced from said first sides so as to form a double side wall;

a substantially rectangular rigid stand;

means for pivotally securing opposite sides of said rectangular rigid stand between said first and second sides;

said shell having an integral front section below said seat;

said shell having an integral arcuate section with a predetermined radius from the pivot axis of said stand;

gear teeth on the outer side of said arcuate section;

a slot extending longitudinally along said arcuate section;

a handle having teeth thereon of a geometrical configuration to mate with a section of said gear teeth;

a rod passing through the inner side of said rectangular stand and through said slot;

means for securing one end of said rod to said handle;

spring means about the other end of said rod for biasing said handle toward said arcuate section; and

an integral handle through the upper back of said shell.

3,976,329

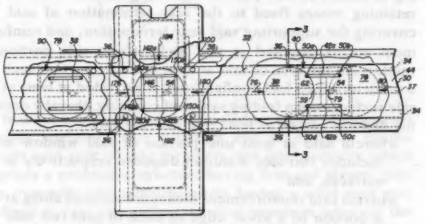
VACUUM BRAKING SYSTEM FOR SEMICONDUCTOR WAFERS

Anthony L. Adams, Richardson, and Troy D. Moore, Garland, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Sept. 9, 1974, Ser. No. 504,644

Int. Cl.² B65G *51/02, 53/58*

U.S. Cl. 302—2 R 21 Claims



8. In a vacuum braking system for stopping the travel of a wafer wherein a vacuum source communicates with air inlets disposed in an air track by means of a control valve, the improvement comprising:

a pair of elongated air inlets disposed in said air track with the elongated portion of each inlet substantially parallel to said wafer travel on said track, and each inlet having a length slightly less than the lengthwise dimension of said wafer disposed directly over said elongated air inlet when said wafer is stopped.

3,976,330

TRANSPORT SYSTEM FOR SEMICONDUCTOR WAFER MULTIPROCESSING STATION SYSTEM

John Paul Babinski; Bruce Irving Bertelsen; Karl Heinz Raacke, all of Essex Junction; Valdeko Harry Sirgo, Colchester, and Clarence Jay Townsend, Essex Junction, all of Vt., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 1, 1975, Ser. No. 618,654

Int. Cl.² B65G *51/02*

U.S. Cl. 302—2 R 13 Claims

1. A minimum volume enclosed semiconductor self-centering fluidic dual lane unidirectional transport system comprising the following interacting elements,

a means for supplying a vectorized fluid cushion onto a transport surface and associated with,

a means for circulating and filtering said fluid used as a transport means and coupled with,

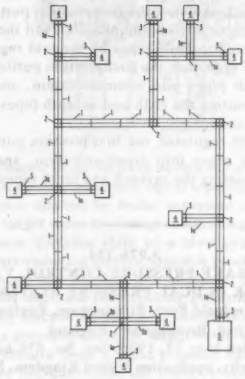
a means for adding make up fluid to the system in order to maintain a relatively constant volume pressure of fluid in said system and,

having an interacting means for providing vacuum ports at specific system locations whereby vacuum eminating therefrom aids in the control of transport of work pieces for directing, and routing work pieces with,

a means for cross over bidirectional intersections connected to,

a means for entering and exiting work pieces to and from said system and associated with,

a means for a storage hold up buffer connected to said system, and



a means for work piece directional turn around with,

a means for connecting said system with a multiplicity of processing units, and

a means for providing the system with connected modular sections coupled with,

a means for automatically controlling the transport of work pieces to and from processing unit stations and exit and inlet said work pieces to and from said system, and

a means for fail safe interconnection of fluid and vacuum supply to said system connected to,

a holding buffer and by pass directional turn around means juxtapostional to the entrance of each processing unit connected to said system.

3,976,331

VERTICAL FEEDER FOR POWDERED MATERIAL

Wolfgang Kluger, Neubeckum, and Heinz Huser, Ahlen, both of Germany, assignors to Polysius AG, Neubeckum, Germany

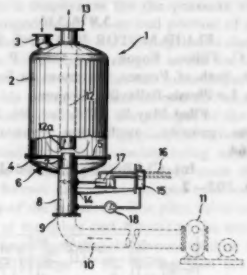
Filed June 27, 1975, Ser. No. 591,137

Claims priority, application Germany, July 30, 1974, 7425955[U]

Int. Cl.² B65G *53/66*

U.S. Cl. 302—53 **8 Claims**

1. A vertical feeder for the pneumatic feeding of powdered material comprising a pressure vessel having an inlet for material; a base; feed-air supply means extending through said base into said vessel; material feed means extending into said vessel from the top thereof and communicating with said feed-air supply means; means for supplying feed-air through said feed-air supply means into said feed means; normally open valve means in said feed-air supply means operable to open and close said feed-air supply means; pneumatic operating means coupled to said valve means for operating the latter; and electro-magnetic control means responsive to the absence of



predetermined feed-air flow through said feed-air means to close said valve means.

3,976,332

POWDER FEED DEVICE FOR FLAME SPRAY GUNS

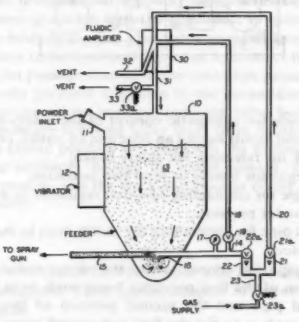
Arthur J. Fabel, Westbury, N.Y., assignor to Metco, Inc., Westbury, N.Y.

Continuation of Ser. No. 836,929, June 26, 1969, abandoned.

This application Jan. 19, 1972, Ser. No. 218,888

Int. Cl.² B65G *53/40*

U.S. Cl. 302—57 **9 Claims**



1. A powder feeding system for a flame spray gun comprising:

a. an enclosed hopper containing a powder to be flame sprayed in loose particulate form;

b. a gas conduit connected to a carrier gas supply and extending to a point of powder carrier gas utilization;

c. A powder intake conduit connected to said gas conduit at a point between said gas supply and said point of utilization and extending into said hopper below the level of said powder and having a geometric design and arrangement such that there is no gravity flow of the powder therethrough into a carrier gas stream in said gas conduit in the absence of a fludizing gas flow therethrough;

d. a fluidizing gas conduit adapted to discharge a regulated amount of fluidizing gas under pressure into said hopper at a point remote from the fluidized zone referred to in (e);

e. said hopper being adapted to cause the fluidizing gas to pass through the powder therein and converge towards said intake conduit and fluidize the powder in the immediate vicinity thereof; and

f. a fluidized zone of said powder in said hopper in the immediate vicinity of said powder intake conduit, the powder surrounding the fluidized zone being non-flui-

dized and acting as a diffusing region for introducing fluidized gas uniformly into said fluidized zone.

3,976,333

FLUID MOTOR BRAKING SYSTEM

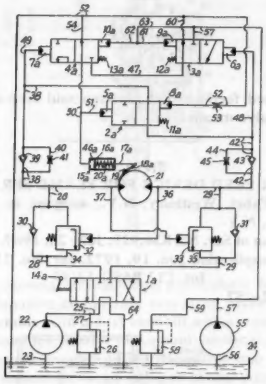
Pierre C. Fillion, Baron, and Gilles P. Vicentini, Tracy-le-Mont, both of France, assignors to Societe Anonyme: Poclain, Le Plessis-Belleville, France

Filed May 8, 1975, Ser. No. 575,511

Claims priority, application France, May 14, 1974, 74.16664

Int. Cl.² B60T *13/22*; B66D *5/00*

U.S. Cl. 303—2 **1 Claim**



1. A device for automatic control of the safety-brake of a pressure-fluid motor having an inlet and an outlet, comprising:

a fluid jack for releasing the safety brake;

a first regulator having at least two positions;

a first pipe for connecting said first regulator to a source of fluid under pressure;

a second pipe for connecting the motor inlet to the said first regulator;

a third pipe for connection to the motor outlet, the first position of the first regulator being such as to block the second pipe and the second position of the regulator being such as to put the first and second pipes into communication;

second, third and fourth regulators having two positions and being coupled to primary and secondary second fluid-motive members, primary and secondary third fluid-motive members, and primary and secondary fourth fluid-motive members respectively, and to second, third and fourth resilient return members, the effects of the fluid pressure on the second, third and fourth primary members being opposed to those of the fluid pressure on the second, third and fourth secondary members and of the second, third and fourth return members, respectively;

a fourth pipe connecting the second regulator to the second pipe;

a fifth pipe connecting the second regulator to the third pipe;

a first constriction arranged in the fifth pipe;

a sixth pipe for connecting a source of brake-release fluid to the third regulator;

a seventh pipe connecting the third regulator to the fourth regulator;

an eighth pipe connecting the third regulator to a discharge tank;

a ninth pipe connecting the fourth regulator to the discharge tank;

a tenth pipe connecting the fourth regulator to the motive chamber of the brake-release jack;

an eleventh pipe connecting the primary motive member of the second regulator to the tenth pipe;

twelfth pipe connecting the secondary motive member of the second regulator to the discharge tank;

a second constriction arranged in said twelfth pipe;

a thirteenth pipe connecting the primary motive member of the third regulator to the fifth pipe;

a fourteenth pipe connecting the secondary motive member of the third regulator to the source of brake-release fluid;

a fifteenth pipe connecting the primary motive member of the fourth regulator to the fourth pipe; and

a sixteenth pipe connecting the secondary motive member of the fourth regulator to the source of brake-release fluid; the two positions of the second, third and fourth regulators effective as follows, respectively:

for the second regulator, the first position putting the fourth and fifth pipes into communication, and the second position blocking the said pipes by the said regulator;

for the third regulator, the first position putting the seventh and eighth pipes into communication, and the second position putting the sixth and seventh pipes into communication; and

for the fourth regulator, the first position putting the ninth and tenth pipes into communication, and the second position putting the seventh and tenth pipes into communication.

3,976,334

VEHICLE BRAKE PRESSURE CONTROL VALVES FOR USE IN DUAL PRESSURE SYSTEMS

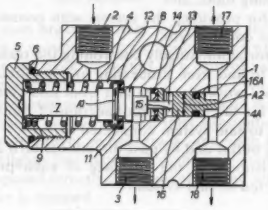
Glyn Phillip Reginald Farr, Birmingham, England, assignor to Girling Limited, Birmingham, England

Filed May 12, 1975, Ser. No. 576,643

Claims priority, application United Kingdom, May 17, 1974, 22120/74

Int. Cl.² B60T *8/26*, *17/18*

U.S. Cl. 303—6 C **8 Claims**



1. A pressure control valve for a braking system having separate pressure circuits, comprisng an inlet and an outlet for connection in one of said circuits, a control valve member movable to control communication between said inlet and said outlet, resilient means biasing said control member in a sense to hold said valve open, means defining a space intermediate and permanently sealed from both said circuits, said control member having an extension which passes sealingly into said space, and a pressure responsive member separate from said control member and subject to the pressure prevailing in said other circuit, wherein said extension has a cross-sectional area which is smaller than any other part of the control member and engages said pressure responsive member within said space, said pressure responsive member being operable under the last-mentioned pressure in said other circuit to overcome the biasing force of said resilient means thereby displacing said control member and closing the valve.

3,976,335

MODULATOR OF AN ANTISKID DEVICE FOR AIR BRAKES

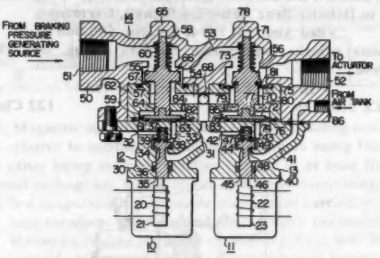
Yukichi Sekiguchi, Yono, Japan, assignor to Sanwa Seiki Mfg. Co., Japan

Filed Oct. 22, 1975, Ser. No. 624,705

Claims priority, application Japan, Aug. 19, 1975, 50-100352

Int. Cl.² B60T 8/02

U.S. Cl. 303—21 F 1 Claim



1. In a modulator of an antiskid device for air brakes of the type wherein a throttling electric signal is produced before the braking pressure applied by brake actuators reaches a pressure increase target value to change the braking pressure from a rapid pressure increase state to a slow pressure increase state, a pressure reducing electric signal is produced when the braking pressure has reached the pressure increase target value to rapidly decrease the breaking pressure, and producing a throttling electric signal again before the braking pressure reaches a pressure decrease target value so as to change the braking pressure from a rapid pressure decrease state to a slow pressure decrease state, the improvements wherein the modulator comprises:

a first solenoid assembly including a plunger adapted to be actuated by said pressure reducing electric signal;

a second solenoid assembly including a plunger adapted to be actuated by said throttling electric signals;

a first pilot valve assembly including a pilot valve assembly main body, a set of passages consisting of an inlet passage, a discharge passage and an operation passage formed in said main body for pressurized air from an air tank, and a pilot valve body mounted in said main body and movable between a closed position in which the inlet passage is closed and the operation passage and the discharge passage are connected and an open position in which the inlet passage and the operation passage are connected and the discharge passage is closed;

a second pilot valve assembly including a pilot valve assembly main body, a set of passages consisting of an inlet passage, a discharge passage and an operation passage formed in said main body for the pressurized air from the air tank, and a pilot valve body mounted in said main body and movable between a closed position in which the inlet passage is closed and the operation passage and the discharge passage are connected and an open position in which the inlet passage and the operation passage are connected and the discharge passage is closed; and

a main valve assembly including a main valve assembly main body, a set of passages consisting of an inlet passage, a connection passage, an outlet passage and a discharge passage formed in said main body for pressurized air from a brake valve, a pressure reducing valve body mounted in said main body and movable between an open position in which the inlet passage is connected to the communication passage and a closed position in which the inlet passage is disconnected from the communication passage and the communication passage is connected to the discharge passage, a throttling valve body mounted in said main body and movable between an open position in which the communication passage is connected to the outlet passage and a throttling position in which the communication passage is connected to the outlet passage such that pressurized air can pass therethrough in a reduced quantity, a diaphragm for the pressure reducing valve body arranged to act on an end portion of a center rod of the pressure reducing valve body, and a diaphragm for the throttle valve body arranged to act on one end portion of a center rod of the throttle valve body; the first solenoid assembly being attached to one end of the first pilot valve assembly such that the plunger of the former can act on an end of a rod of the pilot valve body of the latter, the second solenoid assembly being attached to one end of the second pilot assembly such that the plunger of the former can act on an end of a rod of the pilot valve body of the latter, the first pilot valve assembly being attached at the other end thereof to the main valve assembly main body such that the pressurized air existing in the operation passage of the former can act on the diaphragm for the pressure reducing valve body, and the second pilot valve assembly being attached at the other end thereof to the main valve assembly main body such that the pressurized air existing in the operation chamber of the former can act on the diaphragm for the throttle valve body; the plunger of the second solenoid assembly being actuated, when the throttling electric signal is produced, to move the pilot valve body of the second pilot valve assembly from its closed position to its open position so as to connect the pressure air inlet passage thereof to the operation passage thereof, whereby pressure is applied by the pressurized air to the diaphragm for the throttle valve body to move the throttle valve body from its open position to its throttling position; and the plunger of the first solenoid assembly being actuated, when the pressure reducing signal is produced, to move the pilot valve body of the first pilot valve assembly from its closed position to its open position so as to connect the pressure air inlet passage thereof to the operation passage thereof, whereby pressure is applied by the pressurized air to the diaphragm of the pressure reducing valve body to move the pressure reducing valve body from its open position to its closed position and discharge the pressurized air in brake actuators through the outlet passage, the connection passage and the discharge passage of the main valve assembly.

3,976,336

ANTISKID DEVICE FOR AIR BRAKES

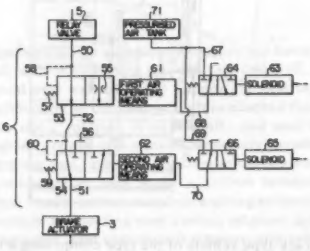
Yukichi Sekiguchi, Yono, Japan, assignor to Sanwa Seiki Mfg. Co., Japan

Filed Oct. 22, 1975, Ser. No. 624,706

Claims priority, application Japan, July 24, 1975, 50-90443

Int. Cl.² B60T 8/02

U.S. Cl. 303—21 F 1 Claim



1. In an antiskid device for air brakes comprising a modulator mounted in a pressuried air line connecting a brake valve to brake actuators, and a signal producing means adapted to produce a pressure reducing electric signal when the braking pressure of each of said brake actuators has reached a pressure increase target value which pressure reducing electric

signal is applied to said modulator to actuate the same so as to reduce the braking pressure applied by each said brake actuator to maintain the slip rate at an optimum value of 0.2 or thereabout by changing the speed of wheels, the improvements wherein said modulator comprises:

a. a first valve capable of moving between an open position in which it allows pressurized air from said brake valve to pass freely therethrough and a throttling position in which it allows the pressurized air to pass therethrough in a reduced quantity;

b. a second valve connected in series with said first valve and capable of moving between an open position in which it allows the pressurized air from said first valve to pass freely therethrough and a discharge position in which it permits pressurized air from the brake actuators to be discharged therethrough;

c. a first air operating means for operating said first valve; and

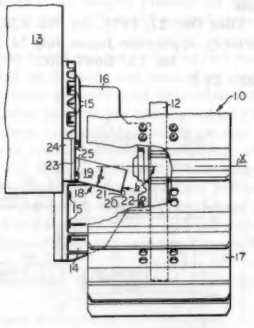
d. a second air operating means for operating said second valve;

said signal producing means first producing a throttling electric signal for actuating said first air operating means and moving said first valve to its throttling position before the braking pressure of the brake actuators reaches the pressure increase target value, and then producing the pressure reducing electric signal for actuating said second air operating means and moving said second valve to its discharge position when the braking pressure has reached the pressure increase target value, whereby an increase in the braking pressure of the brake actuators can be reduced in speed about the time the braking pressure reaches the pressure increase target value so as to thereby avoid an excessive rise of the braking pressure above the pressure increase target value which would otherwise occur due to a time lag of the initiation of a reduction in the braking pressure of the brake actuators behind the production of a pressure reducing electric signal, and the time lag can be reduced by utilizing the force of air for actuating said first valve and said second valve.

3,976,337
STRIKER BAR FOR CLEANING THE TRACKS OF TRACK-TYPE VEHICLES

Kennith E. Vaughn, Creve Coeur, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Mar. 17, 1975, Ser. No. 558,878
Int. Cl.² B60S 1/62
U.S. Cl. 305—12 **11 Claims**

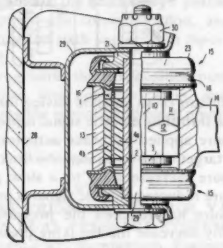


1. In a track-type vehicle of the type comprising a frame, an endless track assembly mounted on said frame, a sprocket motivating said track assembly and a stationary structural member secured to said frame and extending outwardly therefrom in close proximity to said track assembly to define a narrow clearance therebetween, the invention comprising striker bar means secured on said vehicle and extending outwardly therefrom to between said track assembly and said sprocket adjacent to said clearance and in close proximity to said track assembly for breaking-up materials carried by said track assembly thereby towards said narrow clearance.

3,976,338
SLIDE/RUBBER TORSION-BEARING SUPPORT FOR THE ABSORPTION OF AXIAL AND RADIAL FORCES

Kurt Trachte, Echterdingen; Walter Willingshofer, Hofingen, and Einhard Kleinschmit, Esslingen, all of Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany

Filed Aug. 23, 1974, Ser. No. 500,068
Claims priority, application Germany, Aug. 25, 1973, 2342990
Int. Cl.² F16C 27/06; F16F 1/38
U.S. Cl. 308—26 **122 Claims**



6. An elastically yielding pivot bearing support of a structural part for the absorption of forces directed in at least one of the two directions consisting of axial and radial directions with respect to the pivot axis and for the transmission of said forces into a relatively fixed part, which includes at least two sleeve means with the space therebetween filled out by a rubber-elastic material of shock-absorbing layer thickness which is under radial prestress and forms a radial cushion means, one of said sleeve means being operatively connected with the relatively fixed part and the other with the structural part, at least one axial collar means moved along with the structural part and a further corresponding axial collar means moved along with the relatively fixed part, and a layer of rubber-elastic material of shock-absorbing thickness and forming an axial cushion means arranged between the two collar means, characterized in that an axial slide bearing means is arranged between a respective axial collar means and the associated axial cushion means,

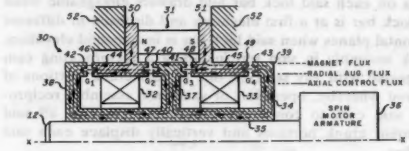
characterized in that the axial cushion means is provided axially on both end faces with a reinforcing means secured thereon, one of said reinforcing means forming one of the axial collar means and being supported at the end face of one of the sleeve means and the other reinforcing means cooperating as axial slide bearing means with the axial collar means connected with the other sleeve means and constructed as axial slide bearing ring, and

characterized in that the reinforcing means of the axial cushion means on the side of the respective sleeve means is supported at the end face of the outer sleeve means of the radial bearing means and in that the axial slide bearing ring is fixedly secured at the corresponding end face of the inner sleeve means, and that for this purpose the inner sleeve means is extended axially with respect to the end face of the outer sleeve means by the overall dimension of axial bearing and axial cushion means, whereby the pivot bearing support is constructed as a pre-assembled, prestressed assembly.

3,976,339
MAGNETIC SUSPENSION APPARATUS

Ajit V. Sabnis, Phoenix, Ariz., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Jan. 14, 1974, Ser. No. 433,430
Int. Cl.² F16C *39/00*
U.S. Cl. 308—10 **3 Claims**



1. Magnetic suspension apparatus for suspending one member relative to another, one of said members being fixed and the other being movable relative thereto in at least first and second orthogonal, translational directions comprising:

a first magnetically permeable core means carried by one of said members and a second magnetically permeable core means carried by the other of said members, said first and second core means having cooperative pole pieces and so relatively shaped and juxtaposed as to define at least four successive magnetically permeable gaps therebetween adapted to conduct magnetic flux lines of force generally parallel to the first of said translational directions,

permanent magnet means carried by one of said core means for producing a constant magnetic flux of one polarity across said first and fourth gaps and of the opposite polarity across said second and third gaps whereby the resultant magnetic forces acting between said core poles tend to oppose relative movement of said members in the second of said translational directions and simultaneously to produce unstable relative movement of said members in the first of said directions,

at least a pair of electromagnetic means also carried by said one core means adapted when energized to produce variable magnitude electromagnetic fluxes of one polarity across said first and second gaps and simultaneously of the opposite polarity across said third and fourth gaps, and

means responsive to relative movement between said members in said first direction for energizing said electromagnetic means in accordance with such movement whereby to produce resultant magnetic forces between said core poles in a direction and magnitude to reduce said movement in said first direction to zero and thereby stabilize said members in said first direction,

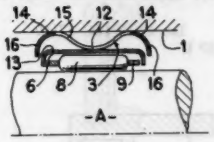
each of said pole pieces including a plurality of lands and grooves for concentrating said flux lines across said gaps at said lands and further includes conductive means within said grooves for providing eddy current damping of said relative movement in said second translational direction.

3,976,340
DEVICE FOR MOUNTING A RADIAL ROLLING BEARING

Alfred Pitner, Paris, France, assignor to Nadella, France, a part interest

Filed Jan. 20, 1975, Ser. No. 542,680
Claims priority, application France, Jan. 23, 1974, 74.02271
Int. Cl.² F16C *33/58*
U.S. Cl. 308—184 R **16 Claims**

1. A device for mounting in a bore of a support a radial rolling bearing having rolling elements, comprising an elastically yieldable collar in which is engaged a thin sleeve which serves as a raceway for the rolling elements and has an elasticity enabling it to deform radially under the action of forces transmitted by the rolling elements, said sleeve being performed in accordance with an irregular profile which defines circumferentially of the sleeve alternately cylindrical segments having an inside radius for defining a passage with an inner raceway for the rolling elements affording a usual radial

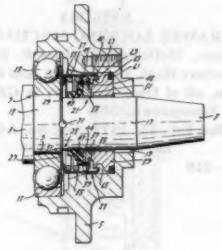


clearance for the rolling elements and inwardly offset cylindrical segments for defining a passage with said inner raceway of reduced radial width for the rolling elements, said elastically yieldable collar comprising a thin-walled ring.

3,976,341
SEAL

Larry Leroy Colley, Dayton, Ohio, assignor to Chrysler Corporation, Highland Park, Mich.

Filed July 21, 1975, Ser. No. 587,578
Int. Cl.² F16C *33/78*
U.S. Cl. 308—187.1 **10 Claims**



1. A gas seal for an automotive compressor having a housing end wall, a shaft extending through said end wall, and a bearing in said end wall rotatably supporting said shaft therein, said shaft having an oil passage therein adapted through which oil flows upon rotation of said shaft, said seal including a cup-shaped retainer arm annular stationary member frictionally engaging said end wall, an annular carbon member drivingly connected to said shaft, a carbon retainer drivingly connected to said carbon member, a spring extending between and drivingly connecting said carbon retainer and said cup-shaped retainer, said cup-shaped retainer, and said stationary member having overlapping lip means, the lip means on said cup-shaped retainer inhibiting the removal of said stationary member from the seal and for also causing oil flowing from said passage to flow in contact with said carbon retainer and said lip means on said stationary member to remove heat therefrom.

3,976,342

METHOD AND APPARATUS FOR REDUCING FRETTING WEAR BETWEEN RELATIVELY MOVING PARTS

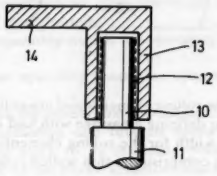
Ralf Leyendecker, Stuttgart, and Gunter Heinke, Gerlingen, both of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Continuation of Ser. No. 369,703, June 13, 1973, abandoned. This application May 20, 1975, Ser. No. 579,230

Claims priority, application Germany, July 13, 1972, 2234428

Int. Cl.² F16C *17/10*

U.S. Cl. 308—237 R 24 Claims



1. The method of improving the friction and wear properties of two surfaces moving against each other with vibratory slip motion, at least one of which surfaces is metallic, which comprises interrupting the continuity of frictional surface engagement by the provision in the friction zone of a multiplicity of individual cavities each of a mouth area of at least 0.02 mm² in such number as to be close to each other and to leave a network of narrow strips to form thereby a web-like bearing surface, whereby the products of wear are taken up by said cavities, said cavities being substantially empty and being provided in such a manner that they have openings facing at least one of said moving surfaces which is free to move in vibratory motion across said opening of said cavities.

3,976,343

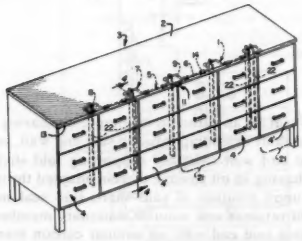
DRAWER LOCKING MECHANISM

Gerald Breckner, McDonald; Charles R. Donahue, Youngstown; C. Herbert Hage, Youngstown, and Philip J. Williams, Youngstown, all of Ohio, assignors to GF Business Equipment, Inc., Youngstown, Ohio

Filed Feb. 11, 1975, Ser. No. 548,920

Int. Cl.² E05B *65/46*

U.S. Cl. 312—219 8 Claims



1. A drawer locking mechanism comprising, in combination with an article of furniture having a top and one or more columns of drawers therebeneath, a lock transfer rod disposed within said top, said rod including a plurality of spaced apart congruent crank portions, all disposed in a common plane, said rod having longitudinally aligned axial means connected adjacent each side of each said crank portion, said axial means comprising an axial portion intermediate each pair of adjacent crank portions and an axial arm connected to the distal portion of each end-most crank portion, each said crank portion including an eccentric arm parallel to said axial means and a pair of radial arms joined to adjacent elements of said axial means, means mounting said rod within said top for simultaneous and equal arcuate displacement of all said crank portions about said axial means, each said drawer column provided with a separate vertical lock bar engageable with a selected one of said rod crank portions, cooperating catch means on each said lock bar and drawers engageable when said lock bar is at a first elevation and disposed in different horizontal planes when said lock bar is in a second elevation, a lock assembly in said top including a reciprocating cam engageable with any selected one of said crank portions of said rod whereby, operation of said lock assembly reciprocates said cam to concurrently arcuately displace all said congruent crank portions and vertically displace each said lock bar.

3,976,344

ASSEMBLY SYSTEM FOR FURNITURE PANELS

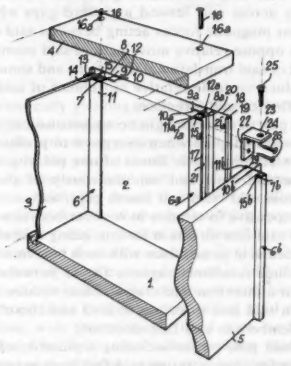
Georges Frydman, Le Rambouillet, Avenue Edith Cavel, 06000 Nice, France

Continuation of Ser. No. 329,113, Feb. 2, 1973, abandoned. This application Feb. 3, 1975, Ser. No. 546,445

Claims priority, application France, Feb. 11, 1972, 72.04642

Int. Cl.² A47B *47/00*, *43/00*

U.S. Cl. 312—263 4 Claims



1. In an article of furniture or the like having an assembly comprising at least two fixed vertical panels joined at right angles to each other, fixed top and bottom panels and a hinged panel facing one of said vertical panels, the combination including at least two extruded profiled members for joining said two vertical panels at their adjacent margins in abutting engagement and for hingedly connecting said hinged panel to one of said vertical panels at the margin opposite said adjacent margins, said profiled members including a longitudinally extending tongue received in a slot provided in the respective opposite end margins of said one vertical panel, at least one of said profiled members including a panel locating flange receiving an end margin of the other of the vertical panels in said abutting engagement, at least one of said profiled members including a longitudinal flange covering an end margin of said hinged panel, said profiled members also including a hole extending throughout their lengths, said top and bottom panels being secured by self-tapping screws inserted vertically into the respective ends of the holes in said profiled members to hold the assembly together.

3,976,345

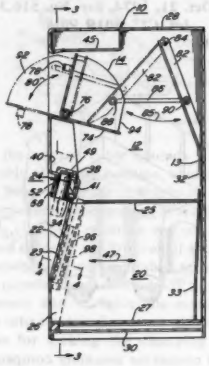
DEPOSITORY

Russell W. Walters, Richmond, Ky., assignor to BMR Security Products Corporation, Richmond, Ky.

Continuation of Ser. No. 311,474, Dec. 4, 1972, abandoned. This application Jan. 14, 1975, Ser. No. 540,825

Int. Cl.[2] B65D *91/00*

U.S. Cl. 312—333 8 Claims



1. A depository comprising

a. a chest defining an interior chamber,

b. means for closing said interior chamber to prevent external access to objects deposited in said interior chamber for safekeeping,

c. a bar member secured to said chest having a single bore,

d. a lock enclosure housing rigidly secured to an outer face of said closing means, said lock enclosure housing having a single through passage aligned with said single bore of said bar member,

e. a bar lock movable within said single through passage and having a lock pin insertable into a recess formed in said single through passage when said bar lock is moved within said through passage and inserted into said single bore of said bar member, said bar lock being only movable within said single through passage and said single bore, and

f. a portion of said closing means extends external to said outer face of said closing means and provides at least a partial cover for said lock enclosure housing.

3,976,346

GUIDE RAILS FOR DRAWERS

Alfred Grass, Konsumstrasse 492, A-6973 Hochst, Vlbg., Austria

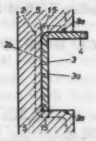
Filed Apr. 25, 1975, Ser. No. 571,767

Claims priority, application Austria, Apr. 25, 1974, 3447/74

Int. Cl.[2] A47B *88/04*; F16C *32/00*

U.S. Cl. 312—350 3 Claims

1. A guide rail for drawers having a frame of the kind in which the rail is mounted in a groove in the side walls of the drawer frame by lugs expanded thereinto comprising a guide rail, lugs on the face of the rail engaging grooves in the side



walls by deformation of the lugs in a direction parallel to the bottom of the groove.

3,976,347

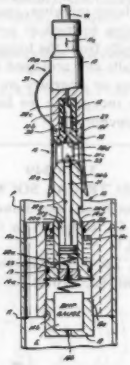
ELECTRICAL CONNECTOR AND METHOD

Milton M. Cooke, Sr., and Milton M. Cooke, Jr., both of 7311 Ardmore, Houston, Tex. 77021

Continuation-in-part of Ser. No. 378,573, July 12, 1973, abandoned. This application Feb. 10, 1975, Ser. No. 548,279

Int. Cl.[2] H01R *13/54*

U.S. Cl. 339—35 20 Claims



1. Apparatus for making an electrical connection in a tubular member, comprising:

a first body disposed in said tubular member;

a second body mounted on a flexible line for movement in said tubular member to establish a connection with said first body, said second body having an electrical contact therewith;

electrical contact means mounted with said first body for engaging said electrical contact on said second body, said electrical contact means including a piston assembly mounted with said first body for movement with respect thereto and having a first body electric contact mounted therewith; and

actuator means operable by manipulating said flexible line for actuating said piston assembly to move said flexible line for actuating said piston assembly to move said first electrical contact into engagement with said electrical

contact on said second body to provide an electrical connection.

3,976,348

ELECTRICAL TAB RECEPTACLE

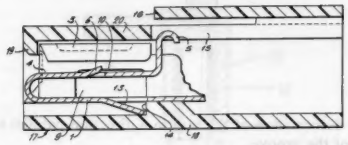
Reginald John Simmons, South Harrow, England, assignor to AMP Incorporated, Harrisburg, Pa.

Filed Apr. 28, 1975, Ser. No. 572,500

Claims priority, application United Kingdom, May 3, 1974, 19542/74

Int. Cl.² H01R 13/62

U.S. Cl. 339—74 R 4 Claims



1. An electrical tab receptacle formed from sheet metal and comprising a generally channel-shaped receptacle portion having a base and upstanding side walls with free edge portions of the side walls turned in over the base for receiving a complementary tab between the base and the turned-in edges of the side walls and an integral tongue extending from the base at the forward, tab-entry end of the receptacle portion, the tongue extending rearwardly in inclined manner towards the turned-in edges of the side walls, the free end of the tongue at the rearward end of the receptacle portion projecting rearwardly beyond the turned-in edges of the side walls, said tongue being turned outwards away from said base and projecting externally of said receptacle portion thereby forming a readily accessible release member, and the tongue within the receptacle portion being formed in a middle portion with a lance inclined rearwardly from the tongue towards the turned-in edges of the side walls and arranged and adapted to engage a corresponding recess or aperture in a complementary tab when mated with the receptacle for latching the tab against withdrawal from the receptacle.

3,976,349

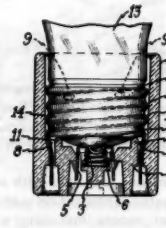
ELECTRICAL SOCKET

Lewis W. Kenyon, Flat Rock, and James L. Grindle, Hendersonville, both of N.C., assignors to General Electric Company, New York, N.Y.

Filed Feb. 21, 1975, Ser. No. 551,709

Int. Cl.² H01R 17/20

U.S. Cl. 339—95 R 8 Claims



1. An electrical socket comprising, in combination, a socket shell formed with a screw thread defining a groove extending around said shell for threadably receiving the complementary thread of an electrical device adapted to be removably mounted in the socket, said shell being formed in said groove with at least one protuberance extending radially inwardly thereof, said protuberance being formed with a front ramp and a rear ramp forming a ridge therebetween extending transverse said groove, the entire outer margin of the protuberance being continuous with and fixed relative to the wall of the groove, whereby when the electrical device is screwed into said shell with its thread first engaging said front ramp and then said rear ramp the thread thereof is cleaned by contact with said ridge during relative movement therebetween.

3,976,350

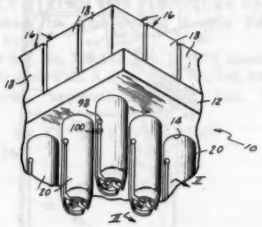
ELECTRICAL CONNECTOR ASSEMBLY HAVING INSULATED INSULATION PIERCING CONTACT PORTIONS

Josef Keglewitsch, Addison, Ill., assignor to Bunker Ramo Corporation, Oak Brook, Ill.

Filed Oct. 21, 1974, Ser. No. 516,377

Int. Cl.² H01R 9/08

U.S. Cl. 339—97 P 7 Claims



1. An electrical connector assembly comprising a plurality of electrical contacts, each of said contacts including an active portion for engaging another contact and an insulation piercing contact portion having a pair of fingers projecting rearwardly therefrom and defining an insulation piercing slot for receiving an insulated conductor extending in a direction transverse to the axis of the respective slot,

a mounting plate,

a plurality of housings each encircling one of said contacts and including insulators shielding the respective insulation piercing portions, each of said insulators including conductor receiving means defining at least one conductor receiving slot aligned with the insulation piercing slot of the respective insulation piercing contact portion, the slot defined by said conductor receiving means of each insulator including means for holding an insulated conductor from retraction from said conductor receiving slot and providing strain relief to said insulator conductor,

and means for replaceably securing each housing in said mounting plate intermediate said active portion and the insulation piercing portion in a matrix of housings with the insulators spaced apart and the conductor receiving slots aligned for shielding the respective insulation piercing portions from being inadvertently connected to a conductor located in the aligned slot of another insulator.

3,976,351

ELECTRICAL CONNECTOR

Dieter H. Hopfe, Houston, Tex., assignor to Mark Products, Inc., Houston, Tex.

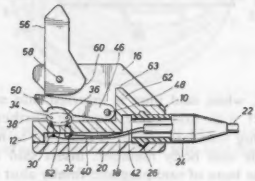
Filed Dec. 12, 1974, Ser. No. 531,896

Int. Cl.² H01R 9/08, 11/20

U.S. Cl. 339—99 R 2 Claims

1. A cable connector for connecting the conductors of a first electrical cable to the conductors of a second electrical cable at any point along the length of the second cable comprising a body of non-conductive material having a base portion for positioning on one side of the second cable at any point along its length, said base portion having an open ended

groove to support the cable without bending the cable, a plurality of electrical contacts attached to the body and located in the groove in position to engage conductors in the second cable, said contacts being connected to the conductors of the first cable and having sharp exposed ends for penetrating the cable insulation covering the conductors of the second cable to engage the conductors, a movable cable clamping member having one end pivotally mounted on the body and the other end extending over the groove in the body and having a groove extending parallel to the groove in the body to combine with the groove in the body to provide a cavity



through which the second cable extends when the clamping member is in cable clamping position, said clamping member being movable away from the contacts to allow the second cable to be positioned in the groove in the body between the contacts and the clamping member and toward the groove to clamp the second cable in the grooves of the member and the body without bending the second cable, means for forcing the cable clamping member toward the body to clamp the second cable therebetween and to force the contacts through the cable insulation into electrical contact with the cable conductors, and means for locking the clamping member in said clamping position.

3,976,352

COAXIAL PLUG-TYPE CONNECTION

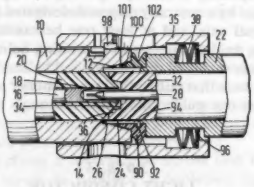
Georg Spinner, Am Eichberg 12, 8152 Feldkirchen-Westerham 1, Germany

Filed Apr. 29, 1975, Ser. No. 572,906

Claims priority, application Germany, Dec. 16, 1974, 2459429; May 2, 1974, 2421321

Int. Cl.² H01R 17/18

U.S. Cl. 339—177 R **19 Claims**



1. Sealed coaxial plug type connection, comprising:

a separate plug section and a separate socket section; each said section comprising an inner conductor, a coaxial outer conductor around said inner conductor and a layer of dielectric material between said inner and outer conductors; in said plug section, its said inner conductor terminates at a free end, and a plug-in pin being formed at that said free end; in said socket section, its said inner conductor terminating at a free end and a pin receiving socket means formed at that said socket section free end;

a first one of said plug and said socket sections supporting resilient fingers that project from that said first section toward the other, said second section, and said fingers extending over and past the first of said free ends which is said free end of said inner conductor of said first section; said fingers being so shaped and positioned as to be capable of being deflected radially inwardly toward said inner conductor, and said fingers being normally biased radially outwardly of said inner conductor;

said dielectric material layer of said first section, which is the first of said dielectric material layers, being normally in engagement with and being deflectable with said fingers of said first section; in the vicinity of said first free end, said first dielectric material layer being so shaped as to be spaced from said inner conductor, thereby to permit the deflection of said first dielectric material layer along with said fingers therof;

said dielectric material layer of said second section, which is the second of said dielectric material layers, being positioned and shaped such that, with said plug in pin in said socket means, said first dielectric layer is deflectable to abut against said second dielectric layer;

said second section having a sleeve projecting toward said first section and projecting beyond the second of said free ends, which is said free end of said inner conductor of said second section; said sleeve having an opening therein leading from the end of said sleeve beyond said second free end back toward said second free end and said sleeve opening being defined by internal walls that taper gradually narrower moving toward said second free end; said sleeve opening being of a width such that said fingers can be moved therein and such that as said first and said second sections are moved together, said fingers are deflected radially inwardly by said sleeve opening internal walls for causing engagement of said first and second dielectric layers.

3,976,353

TERMINAL FOR ELECTRIC CONDUCTORS

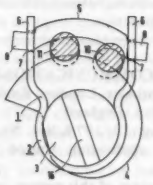
Werner Harbauer, Schwandorf, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Mar. 26, 1975, Ser. No. 562,051

Claims priority, application Germany, Apr. 4, 1974, 2416441

Int. Cl.² H01R 7/06

U.S. Cl. 339—274 **7 Claims**

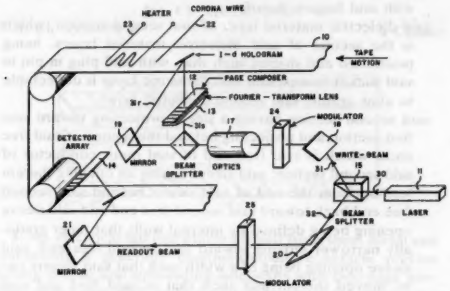


1. In a terminal for an electric conductor including a clamping frame, a cylindrical clamping member rotatably mounted in said frame, said clamping member including a slot-like opening in one endface thereof for receiving a tool for rotating said clamping member and two eccentrically disposed clamping surfaces which protrude beyond said clamping member, and a conductor insertion opening in said clamping frame adjacent said clamping member, the longitudinal axis of said clamping member being parallel to the longitudinal axis of said conductor insertion opening, the improvement comprising two spaced-apart disc-shaped portions, eccentrically disposed on and protruding beyond the surface of said clamping member, the circumferential surfaces of said disc-shaped portions forming said clamping surfaces for said member.

3,976,354
HOLOGRAPHIC MEMORY WITH MOVING MEMORY MEDIUM

Michael F. Braitberg, Littleton, Colo., and Tzuo-Chang Lee, Bloomington, Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Dec. 14, 1974, Ser. No. 424,991
Int. Cl.² G03H 1/16, 1/18, 1/28
U.S. Cl. 350—3.5 **9 Claims**



1. A holographic system comprising:

a memory medium for storing holograms;

light source means for producing mutually coherent elongated signal and reference beams;

page composer means positioned in the path of the elongated signal beam for creating an elongated bit pattern in the signal beam, the elongated bit pattern containing a plurality of bits arranged in an essentially linear array;

Fourier transform means for producing a one-dimensional Fourier transform of the elongated bit pattern at the memory medium;

beam directing means for directing the signal and reference beams to a common position at the memory medium whereby the signal and reference beams interfere to store a one-dimensional Fourier transform hologram having interference fringe lines and an elongated dimension, the elongated dimension being oriented in a first direction and the interference fringe lines being oriented in a second, essentially orthogonal direction;

means for providing relative motion of the memory medium with respect to the signal and reference beams essentially in the second direction.

3,976,355
OPTICAL COMMUNICATIONS SYSTEMS

Michael Robert Matthews, London, England, assignor to The Post Office, London, England

Filed Aug. 13, 1974, Ser. No. 497,094
Claims priority, application United Kingdom, Aug. 24, 1973, 40221/73
The portion of the term of this patent subsequent to Sept. 2, 1992, has been disclaimed.
Int. Cl.² G02B 5/14
U.S. Cl. 350—96 C **8 Claims**

1. A plug and socket for optically coupling first and second lengths of dielectric optical waveguide, said lengths having substantially identical end sections, comprising:

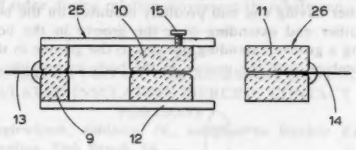
socket means having a body member rigidly affixed therein, said body member having an unobstructed capillary bore therethrough extending axially of said socket means;

a first length of dielectric optical waveguide rigidly supported in said bore and extending beyond said body and into said socket means;

a guide member slidably received within said socket spaced axially from said body and having an unobstructed capillary bore aligned with said body bore, said first length of waveguide extending at least partially therethrough;

a plug, sized to be slidably received within said socket means, said plug also having an unobstructed capillary bore therethrough which aligns with said other bores when said plug is positioned within said socket; and

a second length of waveguide rigidly supported partially within said plug bore;



whereby, when said plug is inserted into said socket into contact with said guide member, further movement of said plug into said socket is effective to move said guide towards said body member, insert said first waveguide into the bore of said plug and finally abut the ends of said first and second waveguides within said plug.

3,976,356
OPTICAL DIELECTRIC WAVEGUIDES

Richard Charles Lloyd Jenkins, 35 St. Mary's Avenue, Alverstoke, Gosport, Hampshire, England

Filed Sept. 3, 1974, Ser. No. 502,641
Claims priority, application United Kingdom, Sept. 6, 1973, 42066/73
Int. Cl.² G02B 5/14
U.S. Cl. 350—96 WG **19 Claims**

1. An optical fiber for guiding optical electromagnetic wave energy comprising a unitary optically transparant structure characterized by a centrally disposed elongated filament having a longitudinal axis, and at least one helicoidal surface ridge surrounding said filament and extending helically along said axis, the cross-sectional dimensions and helical period p of said ridge being such that said optical wave energy can be propagated in at least one guided mode therethrough.

3,976,357
LIGHT CONDUCTOR

Hartmut Lohmeyer, Schleissheimer Strasse 189, 8000 Munich 40, Germany

Filed Feb. 26, 1975, Ser. No. 553,240
Claims priority, application Germany, Mar. 4, 1974, 2410288
Int. Cl.² G02B 5/14
U.S. Cl. 350—96 R **12 Claims**

1. A light conductor made of transparent optical material comprising integral core means, protective envelope means surrounding said integral core means, said integral core means having a uniform cross-section throughout its length, a plurality of supporting ribs, land means extending out of said core means and connecting said ribs to said core means, means securing said ribs to said protective envelope means, said ribs merging into said land means in such a manner that said core means, said ribs, and said land means are surrounded on all sides by hollow spaces, said ribs having walls tapering toward

said securing means whereby a light beam entering into said supporting ribs through said land means from said core means

is intercepted by said tapering walls of said supporting ribs which thus reflect said light beam back into said core means.

3,976,358

VARIABLE OPTICAL COUPLER

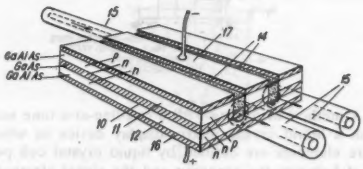
George H. B. Thompson, Harlow, England, assignor to International Standard Electric Corporation, New York, N.Y.

Filed July 9, 1975, Ser. No. 594,480

Claims priority, application United Kingdom, Aug. 8, 1974, 34979/74

Int. Cl.² G02B 5/14

U.S. Cl. 350—96 C 15 Claims



1. A semiconductive double heterostructure optical waveguide coupler comprising:

a first layer of semiconductive material having first and second major surfaces;

a second layer of semiconductive material on said first major surface;

a third layer of semiconductive material on said second major surface, said first layer having an index of refraction higher than said second and third layers;

a plurality of channels of semi-insulating material forming coupled optical waveguides, said channels extending through said first and second layers; and

means for applying a reverse bias across said first, second and third layers to produce a depletion region which alters the optical coupling between said waveguides.

3,976,359

INSTANT COLOR MOVIE SCREEN

Addison A. White, 518 Wealthy SE., Grand Rapids, Mich. 49503

Filed Dec. 2, 1974, Ser. No. 528,984

Int. Cl.² G03B 21/60

U.S. Cl. 350—126 1 Claim

1. An instant color movie screen comprising, in combination:

a vertical telescoping mast having a top portion and a bottom portion, an adjustable tripod stand affixed to said bottom portion for supporting said mast in a vertical position, an elongated cylindrical housing pivotally mounted at its midpoint to a position on said vertical mast for rotation thereabout between the hearing position and a horizontal operative position, a length of screen material disposed about a roller spring biased and journaled for rotation in said cylindrical casing, with said screen having a top edge, a rigid rod affixed along said top edge of said screen, and a hook affixed centrally of said rigid rod adapted to affix said screen in an open operative position extending along a portion of said vertical mast and engaging a hook disposed on the top end portion of said mast;

a length of flat cloth material having a back surface and a front surface, a length of flat vinyl sheeting material having a front surface and a back surface, means of fixing said vinyl sheeting in juxtaposition with said cloth material with said back surface of said vinyl sheeting in juxtaposition with said front surface of said cloth material, and a multitude of generally glass or plastic spherical beads each of an orange color and each manufactured of a light reflecting material affixed to said front surface of said vinyl sheeting, each bead contacting each bead surrounding it to provide a solid appearing orange color light reflecting surface completey over said vinyl sheeting;

an elongated hollow closed end cylindrical rigid member affixed to said top edge of said screening and extending completely therealong, a compartment defined interiorly of said top cylindrical member, a hanging member affixed centrally of said top rigid member adapted to secure the

same to the top end portion of said vertical mast to retain said screening in an open operative position, and orange colored light emitted from said top member impinging on a front surface of said screen to provide an orange overall color to said screen front surface; and

said top edge of said screen being affixed to an interior circumference of said cylindrical top member by rivets extending through a side wall of said top member, a plurality of electrical sockets affixed in said compartment, electrically insulated wiring means connecting said socket in electric parallel relationship with each other, an aperture in one end of said cylindrical top member, an electrical cord having an electrical plug affixed to one end thereof adapted to be plugged into a conventional household receptacle with the opposite end of the cord affixed to the wiring connecting said socket in an electrical parallel relationship, a plurality of orange colored high intensity electric lamps with one lamp for each socket and each lamp being threadably received in its associated socket to be electrically energized thereby, an elongated rectangularly configured slot disposed on a side wall of said cylindrical top member extending along a top surface of said screen disposed between said orange colored lamps and said screen, and whereby said orange colored light from said lamps completely covers the front surface of said screen with said light rays impinging on said screen at an angle not interferring with the image of the movie projecting on said screen.

3,976,360

PRISM ARRANGEMENT FOR DIGITAL ELECTRO-OPTICAL LIGHT DEFLECTION SYSTEMS

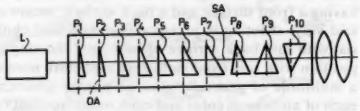
Eckhard Schroder, Henstedt-Ulzburg, Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 29, 1974, Ser. No. 518,225

Claims priority, application Germany, Nov. 2, 1973, 2354892

Int. Cl.² G02F 3/00

U.S. Cl. 350—150 4 Claims



1. A prism arrangement for the formation of a dot pattern for digital electro-optical light deflection systems, in which the refracting angle of each successive prism of a series of prisms which are disposed in line, is twice that of the preceding prism, wherein for a double-refracting prism with a refracting angle sufficiently large to cause aberrations the prism apex angle is intersected by the plane containing the optic axis of the prism, which axis is perpendicular to the system axis, in such a way that the ratio of the two partial angles formed with the optic axis of the relevant prism ranges between approximately 3/5 and 4/3, at least one of said double refracting prisms with refracting angles sufficiently large to cause aberrations having a non-unity partial angle ratio.

3,976,361

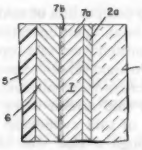
CHARGE STORAGE DIODE WITH GRADED DEFECT DENSITY PHOTOCAPACITIVE LAYER

Lewis M. Fraas, Malibu, and William P. Bleha, Jr., Pacific Palisades, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Continuation-in-part of Ser. No. 524,596, Nov. 18, 1974, abandoned. This application Oct. 22, 1975, Ser. No. 625,331

Int. Cl.² G02F 1/13

U.S. Cl. 350—160 LC 16 Claims



1. A photodiode for an alternating current driven light valve of the type wherein the photocapacitance of a light responsive semiconductor layer of said diode which is supported on a transparent substrate of said valve to receive light transmitted therethrough can be modulated in response to changes in the intensity of such incident light, the improvement in said diode comprising:

a. first and second semiconductor layers forming the rectifying junction of a charge storage photodiode;

b. said first layer being a light responsive photoconductor the photocapacitance of which can be modulated in response to changes in the intensity of said incident light and being located between said second layer and said substrate, and said second layer being a semiconductor having an impurity type opposite to that of said first layer;

c. said first layer having a defect center gradient from a first region of semiconductor material having a low density of defect centers to a second region of semiconductor material having a higher density of defect centers, said second region being contiguous with said junction and said first region being contiguous with said second region and being exposed to receive said incident light which is effective to generate charge carriers which are stored in said second region and which change the photocapacitive depletion width adjacent said junction to enhance the sensitivity of said diode; and,

d. a voltage or field activated light modulating medium adjacent said second layer on the side opposite the first layer, said medium and said first and second layers being sandwiched between a pair of transparent electrodes.

3,976,362

METHOD OF DRIVING LIQUID CRYSTAL MATRIX DISPLAY DEVICE

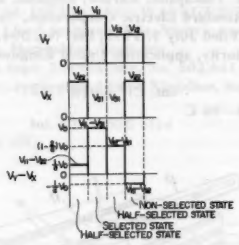
Hideaki Kawakami, Hitachi, Japan, assignor to Hitachi, Ltd., Japan

Filed Oct. 15, 1974, Ser. No. 514,992

Claims priority, application Japan, Oct. 19, 1973, 48-116888

Int. Cl.² G02F 1/13

U.S. Cl. 350—160 LC 4 Claims



1. A method of driving with a one-line-at-a-time scanning system a liquid crystal matrix display device in which the picture elements are defined by liquid crystal cell portions formed between the scanning and the signal electrodes arranged in the form of a matrix, characterized in that the amplitude of the DC voltage applied to non-selected cells along a selected scanning electrode is made different from the amplitude of the DC voltage applied to non-selected cells along a selected signal electrode and the amplitude of the DC voltage applied to non-selected cells along the selected signal electrode is made equal to the amplitude of the DC voltage applied to the remaining non-selected cells.

3,976,363

OPTICAL SYSTEM FOR COLOR TELEVISION CAMERA

Seiji Toyama, Kawaguchi, and Kazuo Yoshikawa, Omiya, both of Japan, assignors to Fuji Photo Optical Co., Ltd., Omiya, Japan

Filed July 1, 1974, Ser. No. 484,973

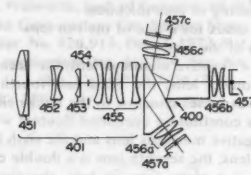
Claims priority, application Japan, July 2, 1973, 48-73649

Int. Cl.² G02B 27/10; H04N 9/04

U.S. Cl. 350—173 3 Claims

1. An optical system for a color television camera comprising a front lens component including a zooming system and a front part of a relay lens system through which the light from the zooming system is converged, a color separating prism system located in the converging light, said prism system having an entrance face and a plurality of exit faces for giving separated light beams of different color located behind said front lens component, and equivalent convergent rear lens components of the same number as said exit faces located behind the exit faces, said convergent rear lens components including the rear part of said relay lens system which has a positive power to further converge the light from the prism

system, whereby the angle of marginal light beams defining the F-number of the optical system is made smaller than that



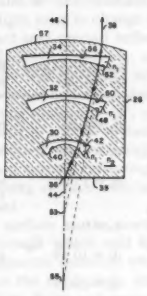
of the beams incident into the focusing plane of image pick-up tubes located behind said rear lens components.

3,976,364

OPTICAL AIR LENS SYSTEM

Harley Burke Lindemann, 1533 Park Grove Road, Baltimore, Md. 21228, and John Boyden Goodell, 1201 Southview Road, Baltimore, Md. 21218

Continuation-in-part of Ser. No. 427,257, Dec. 21, 1973, abandoned. This application Mar. 17, 1975, Ser. No. 559,011
Int. Cl.² G02B *1/06*; G02C *1/00*
U.S. Cl. 350—179 **36 Claims**



1. An optical lens system operative on a light ray comprising:

a first optical medium having a first refractive index,

a second optical medium having a second refractive index of a higher value than said first refractive index,

a plurality of pockets formed in said second optical medium containing said first optical medium, said plurality of pockets having a single coincident optical axis and each defining first and second optical surfaces at the interfaces between said first and second optical mediums,

an object located substantially at an aplanatic point of at least one of said optical surfaces within or contiguous to said second opical medium,

selected surfaces from among said first and second optical surfaces through which said light ray when emanating in a direction from said object toward said plurality of pockets is refracted when passing from high to low refractive index mediums being so constructed and arranged relative to said object to refract said ray aplanatically thereby substantially eliminating spherical aberration and coma, and

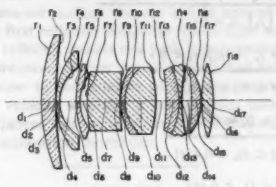
all said optical surfaces other than said selected surfaces are so constructed and arranged to pass said light ray substantially without refraction.

3,976,365

LARGE-APERTURE, ULTRA WIDE ANGLE PHOTOGRAPHIC LENS SYSTEM

Jihei Nakagawa, Higashi-murayama, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Feb. 21, 1975, Ser. No. 551,854
Claims priority, application Japan, Feb. 23, 1974, 49-21632
Int. Cl.² G02B *9/64*
U.S. Cl. 350—214 **5 Claims**



1. A large-aperture, ultra wide angle photographic lens system comprising a first positive meniscus lens, a second negative meniscus lens, a third negative meniscus lens, a fourth positive lens, a fifth positive cemented doublet lens, a sixth negative cemented doublet lens, a seventh positive lens and an eighth positive lens, said lens system satisfying the following conditions:

$$3.4f < f_4 < 6.5f \quad (1)$$

$$1.2f < f_5 < 1.45f \quad (2)$$

$$0.35f < d_7 < 0.6f \quad (3)$$

$$0.4f < d_9 + d_{10} < 0.55f \quad (4)$$

$$0.05 < (n_7 - n_8)/r_{13} < 0.06 \quad (5)$$

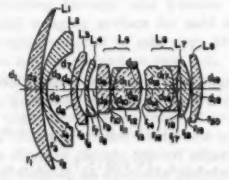
wherein the reference symbols f_4 and f_5 represent respective focal lengths of the fourth lens and fifth cemented doublet lens, reference symbols d_7, d_9 and d_{10} represent thicknesses of the fourth lens and respective lens elements of the fifth cemented doublet lens, reference symbols n_7 and n_8 represent refractive indices of respective lens elements of the sixth cemented doublet lens and reference symbol r_{13} represent radius of curvature on the cemented surface of the sixth cemented doublet lens.

3,976,366

RETROFOCUS-TYPE ULTRA-WIDE ANGLE PHOTOGRAPHIC LENS SYSTEM

Nobuo Yamashita, Tama, Japan, assignor to Olympus optical Co., Ltd., Tokyo, Japan

Filed Aug. 20, 1974, Ser. No. 499,024
Claims priority, application Japan, Aug. 21, 1973, 48-93654
Int. Cl.² G02B *9/64*
U.S. Cl. 350—214 **11 Claims**



1. A retrofocus-type ultra-wide angle photographic lens system comprising a first lens component having a positive power, a second lans component being a negative meniscus lens, a third lens component being a negative meniscus lens,

a fourth lens component having a negative power, a fifth lens component having a positive power, a sixth lens component being a negative lens, a seventh lens component being a positive meniscus lens and an eighth lens component having a positive power, and said retrofocus-type ultra-wide angle photographic lens system satisfying the following conditions:

$$[0.52f < |f_{1234}| < 0.73f, f_{1234} < 0]$$

$$0.55f < |f_{1234}| < 0.70f, f_{1234} < 0 \quad (1)$$

$$[r_a > |r_b|, r_b < 0]$$

$$2.2f > r_a > |r_b|, r_b < 0 \quad (2)$$

$$[0.62f < D_5 < 0.91f]$$

$$0.65f < D_5 < 0.87f \quad (3)$$

$$[0.35f < D_6 < 0.47f]$$

$$0.37f < D_6 < 0.45f \quad (4)$$

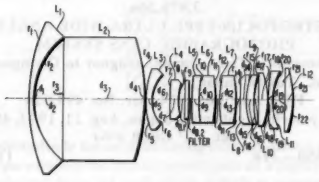
wherein reference symbol f represents the focal length of the lens system as a whole, reference symbol f_{1234} represents the total focal length of the first through fourth lens components, reference symbol r_a represents the radius of curvature of the surface nearest the object of the fifth lens component, reference symbol r_b represents the radius of curvature of the surface nearest the image of the fifth lens component, reference symbol D_5 represents the distance from the surface nearest the object to the surface nearest the image of the fifth lens component, reference D_6 represents the distance from the surface nearest the object to the surface nearest the image of the sixth lens component.

3,976,367

RETROFOCUS TYPE WIDE ANGLE LENS OF LOW F-NUMBER

Yasuo Takahashi, Tokyo, and Sadao Okudaira, Saitama, both of Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 3, 1975, Ser. No. 546,483
Claims priority, application Japan, Feb. 1, 1974, 49-13455
Int. Cl.[2] G02B 9/00
U.S. Cl. 350—214 2 Claims



1. A wide angle lens comprising twelve lenses grouped in ten components which satisfies the following conditions:

$$F/1.8 < |F_{1,2,3,4}| < F/1.1, F_{1,2,3,4} < 0 \quad (1)$$

$$F/0.6 < |F_{1,2,3,4,5,6}| < F/0.15, F_{1,2,3,4,5,6} < 0 \quad (2i)$$

$$F/1.4 < F_{1,2,3,4,5,6,7} < F/0.8 \quad (2ii)$$

$$0.1 < n_6 - n_9 < 0.2 \quad (3)$$

$$0.3\,l < (d_1 + d_3 + d_9 + d_4 + d_5) < 0.5\,l \quad (4)$$

wherein the characters designate dimensions as follows:
F: composite focal length
$F_{1,2,\ldots,i}$: composite focal length of the lens system : consisting of the first to the i-th lenses
d_j: the j-th spacing or lens thickness
n_i: refractive index for d-line of the i-th lens
l: total length of the lens

the first lens is a negative meniscus lens, the second lens is a thick double convex lens, the third and fourth lenses are negative meniscus lenses concave to the image side, the fifth and sixth lenses constitute a cemented doublet with the fifth lens being a negative meniscus lens and the sixth lens being a double convex lens, the seventh lens is a double convex lens, the eighth lens is a plano-concave lens, the ninth lens is a positive meniscus lens cemented with said eighth lens, the tenth lens is a double convex lens, the eleventh lens is a negative meniscus lens, and the twelfth lens is a plano-convex lens, and further comprising a filter located between said fourth lens and said fifth lens wherein the radii r_1 to r_{22}, the thicknesses and separations d_1 to d_{21}, the refractive indices n_1 to n_{12}, and Abbe numbers ν_1 to ν_{12} of said first to twelfth lenses L_1 to L_{12}, respectively, satisfy the following conditions:

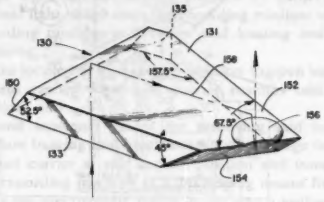
F = 100
$F_{1,2,3,4} = -70.42$
$F_{1,2,3,4,5,6} = -274.72$
$F_{1,2,3,4,5,6,7} = 108.22$
(back focal length)
$f_B = 178.14$

Lens	Radius of Curvature r	Lens Thickness or Distance d	Refractive index n	Abbe No. ν
	$r_1 = 324.0$			
L_1		$d_1 = 5.82$	$n_1 = 1.6400$	$\nu_1 = 60.2$
	$r_2 = 126.0$			
		$d_2 = 54.94$		
	$r_3 = 3321.8$			
L_2		$d_3 = 139.21$	$n_2 = 1.6204$ 161	$\nu_2 = 60.3$
	$r_4 = -350.9$			
		$d_4 = 0.48$		
	$r_5 = 119.7$			
L_3		$d_5 = 10.19$	$n_3 = 1.5119$	$\nu_3 = 58.1$
	$r_6 = 58.5$			
		$d_6 = 28.29$		
	$r_7 = 189.8$			
L_4		$d_7 = 14.56$	$n_4 = 1.8160$	$\nu_4 = 46.8$
	$r_8 = 86.5$			
		$d_{8-1} = 12.13$		
	filter			
		filter thickness = 3.88		
		$d_{8-2} = 4.85$		
	$r_9 = 487.4$			
L_5		$d_9 = 11.26$	$n_5 = 1.8074$	$\nu_5 = 35.4$
	$r_{10} = 216.3$			
L_6		$d_{10} = 28.73$	$n_6 = 1.7407$	$\nu_6 = 27.8$
	$r_{11} = -189.7$			
		$d_{11} = 7.76$		
	$r_{12} = 159.7$			
L_7		$d_{12} = 26.74$	$n_7 = 1.5892$	$\nu_7 = 41.1$
	$r_{13} = -236.3$			
		$d_{13} = 5.67$		
	$r_{14} = \infty$			
L_8		$d_{14} = 11.40$	$n_8 = 1.8051$	$\nu_8 = 25.4$
	$r_{15} = 95.5$			
L_9		$d_{15} = 10.63$	$n_9 = 1.6393$	$\nu_9 = 44.9$
	$r_{16} = 202.0$			
		$d_{16} = 7.18$		
	$r_{17} = 4078.3$			
L_{10}		$d_{17} = 15.48$	$n_{10} = 1.6170$	$\nu_{10} = 62.8$
	$r_{18} = 110.2$			
		$d_{18} = 0.97$		
	$r_{19} = 324.2$			
L_{11}		$d_{19} = 7.28$	$n_{11} = 1.8051$	$\nu_{11} = 25.4$
	$r_{20} = 108.8$			
		$d_{20} = 14.27$		
	$r_{21} = \infty$			
L_{12}		$d_{21} = 14.02$	$n_{12} = 1.7865$	$\nu_{12} = 50.2$
	$r_{22} = -169.6$			

3,976,368
SPECIAL OPTICAL ELEMENT FOR CAMERA TO MICROSCOPE ADAPTOR

Mary Conlin McCann, Belmont; William T. Plummer, and Vivian K. Walworth, both of Concord, all of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Division of Ser. No. 420,913, Dec. 3, 1973, Pat. No. 3,900,858. This application Dec. 4, 1974, Ser. No. 529,407
Int. Cl.² G02B 5/04, 7/18
U.S. Cl. 350—286 1 Claim



1. An optical article, comprising:

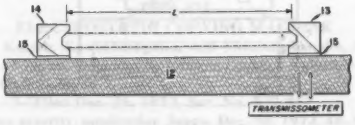
an optically transparent material with a refractive index greater than 1.0 including, a pair of smooth parallel surfaces, a first reflecting surface for reflecting light, entering said article through a first of said smooth surfaces, along the channel defined by said smooth parallel surfaces, a second reflecting surface for reflecting said light coursing along said channel through the second of said smooth surfaces, and an intermediate reflecting surface for reflecting said light so as to change its direction within said channel toward said second reflecting surface, said article being configured so that the angle between said first smooth surface and said first reflecting surface is 52½°, the angle between said second smooth surface and said second reflecting surface is 45°, and said intermediate reflecting surface is normal to said parallel first and second smooth surfaces and the angle defined by the intersections of said second reflecting surface and said intermediate reflecting surface with said second smooth surface is 67½°; and

a positive refracting surface on the portion of said second smooth surface through which said light emerges from said optically transparent material, whereby said reflecting surface changes the solid angle otherwise subtended by said light emerging from said second smooth surface.

3,976,369
ALPHA METER ATTACHMENT FOR UNDERWATER OPTICAL SYSTEMS

Peter D. McCardell, San Diego, and Paul J. Heckman, Jr., Rancho Santa Fe, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 27, 1975, Ser. No. 553,698
Int. Cl.² G02B 5/00
U.S. Cl. 350—319 10 Claims



1. An underwater port for an oceanographic submersible vehicle comprises:

transparent means having an interior and exterior surface and configured for mounting integrally in the hull of the oceanographic submersible vehicle for permitting light passage between the interior and exterior thereof;

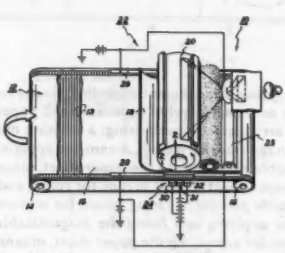
first reflector means attached to said transparent means on the exterior surface thereof for changing the direction of light travel from transverse through the transparent means to parallel to the exterior surface thereof and vice-versa; and

second reflector means attached to said transparent means on the exterior surface thereof and in optical alignment with said first reflector means to return light reflected by said first reflector means in a path approximately parallel to the direction of light travel exiting said reflector for transmission to the interior of the oceanographic submersible vehicle, whereby a transmission path is established adjacent said underwater port with a minimum of physical separation therefrom.

3,976,370
BELT TRANSFER AND FUSING SYSTEM

Narendra S. Goel, Henrietta, and Gerald M. Fletcher, Pittsford, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Continuation-in-part of Ser. No. 421,177, Dec. 3, 1973, Pat. No. 3,832,053. This application Mar. 28, 1974, Ser. No. 455,684
Int. Cl.² G03G 15/00
U.S. Cl. 355—3 R 19 Claims



1. In an electrostatographic copying system in which an image of fusable imaging material is formed on an imaging surface and electrostatically transferred at a transfer station to copy sheets and then fused to the copy sheets at a fusing station, wherein the copy sheets are feedable into said copying system from a sheet feeding station and removable at an output station with an image fused thereon, the improvement comprising:

a single endless transporting and supporting belt for transporting said copy sheets in said copying system through both said transfer station and said fusing station,

retaining means for retaining said copy sheets on said belt fully supported by said belt from only one side of said copy sheets,

said belt extending through said transfer station closely adjacent said imaging surface for said transfer of said fusable imaging material to said copy sheets while said copy sheets are so retained on said belt,

said same belt being extended on through said fusing station for fusing of said imaging material on said copy sheets while said copy sheets are so retained on said belt,

wherein said retaining means comprises a multiplicity of electrically discrete closely spaced adjacent conductors on said belt forming an extensive pattern over said belt, and biased electrode means for differentially electrically charging adjacent conductors of said supporting belt for generating over said supporting belt a fine charge pattern of alternating closely adjacent differentially charged areas providing copy sheet retaining electrical fringe fields.

the spacing of said conductors being sufficiently close so that said image transfer at said transfer station is unaffected by said charge pattern of said electrical fringe fields.

3,976,371

MOUNTING ARRANGEMENT FOR COMPONENT ELEMENTS OF COPYING MACHINE

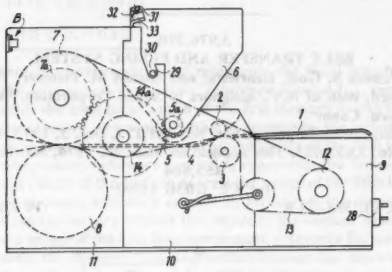
Kurt Moser, Gerlingen, and Reinhold Weigele, Korntal, both of Germany, assignors to Develop KG/Dr. Eisbein and Co., Germany

Filed Aug. 16, 1974, Ser. No. 498,110

Claims priority, application Germany, Aug. 16, 1973, 2341531

Int. Cl.² G03G *15/00*

U.S. Cl. 355—3 DD **23 Claims**



1. A copying arrangement including means for transferring an image as a charge relief onto a coated paper sheet or the like, the arrangement comprising: a housing means for housing the image transfer means, means for applying and fixing a magnetizable powder onto the paper sheet, means for conveying the paper sheet to said means for fixing and applying the magnetizable powder, a casing means for accommodating said means for applying and fixing the magnetizable powder and said means for conveying the paper sheet, means for mounting said casing means in said housing so as to be displaceable in the conveying direction of the paper in the manner of a drawer, said means for applying and fixing a magnetizable powder onto the paper sheet includes a magnetized roller means, means for mounting said magnetized roller in proximity to the sheet, and pressure roller means disposed downstream of said magnetized roller means for fixing the magnetizable powder to the paper sheet.

3,976,372

ELECTROPHOTOGRAPHICAL REPRODUCTION OF A MULTICOLOR IMAGE

Shizuo Miyata, Osaka; Yoshihide Nakao, Nara; Koichi Irihara, Nara; Ryoichi Kawai, Nara, and Motokazu Nakao, Sakurai, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Nov. 13, 1974, Ser. No. 523,511

Claims priority, application Japan, Nov. 13, 1973, 48-127596; Nov. 20, 1973, 48-130451; Nov. 20, 1973, 48-130452; Nov. 20, 1973, 48-130453; Nov. 21, 1973, 48-131241

Int. Cl.² G03G *15/01*

U.S. Cl. 355—4 **5 Claims**

1. A multicolor electrophotographic machine comprising an image receipt sheet supply station for supplying image receipt sheets, a charge formation station for forming a uniform charge on the image receipt sheet, means for conveying the image receipt sheet from said supply station to said charge formation station, a stationary light exposure station for applying an image to the image receipt sheet, a development section comprising a plurality of aligned developer reservoirs, each containing a different color developer toner, means for shifting the development section containing said aligned developer reservoirs to move in the aligned direction, a plurality of pairs of guide rollers installed above the respective developer reservoirs comprising said development section for conducting the

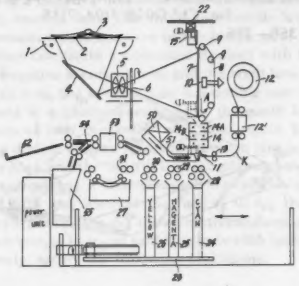


image receipt sheet into the respective developer reservoirs, a sheet carriage for grasping the image receipt sheet and conducting the same, in sequence, to the charge formation station, concurrently with the shifting of the development section from one developer reservoir to another developer reservoir and a stopper means for determining a stationary position of the sheet carriage in the light exposure station.

3,976,373

ELECTROPHOTOGRAPHIC COPYING APPARATUS WITH RECIPROCATING RECORDING MEDIUM CARRIER

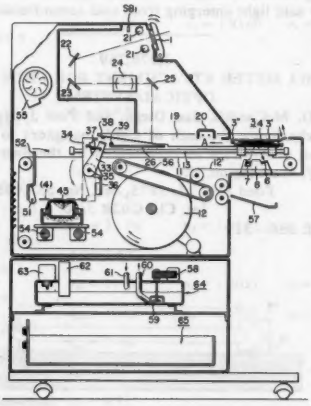
Kazuo Kawakubo, Hino; Isao Takahashi, Yokohama, and Susumu Sugiura, Yamato, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sept. 10, 1973, Ser. No. 395,444

Claims priority, application Japan, Sept. 14, 1972, 47-92342

Int. Cl.² G03G *15/22*

U.S. Cl. 355—10 **21 Claims**



1. An electrophotographic copying machine useful for forming an image of a small original upon a recording medium comprising:

a. means for supporting an original and means for exposing the original to light to form a light image of the original;

b. first transport means for transporting a recording medium from a loading position to a second position, said first transport means including a recording medium carrier having a cover by which the recording medium is positioned within said carrier at said loading position, and further including guide rails and drive means for moving said carrier between said loading and second positions along said guide rails;

c. processing means for forming an electrostatic latent image upon said recording medium by projecting the original light image onto the recording medium when the recording medium is between said loading and second positions;

d. means located at said second position to open said cover of said carrier when said carrier reaches said second position; and

e. second transport means for removing said recording medium bearing said electrostatic latent image from said opened carrier at said second position and transporting said recording medium to a developing means for developing the electrostatic latent image into a visible image.

3,976,374

ELIMINATION OF REDUNDANT IMAGE

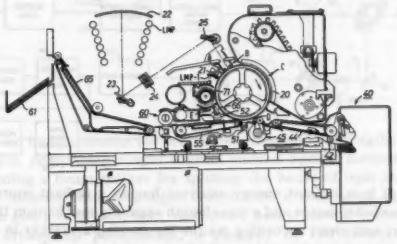
Robert George Hickman, Burghlere, near Newbury, England, assignor to Rank Xerox Ltd., London, England

Filed Mar. 11, 1975, Ser. No. 557,422

Claims priority, application United Kingdom, Apr. 18, 1974, 17063/74

Int. Cl.² G03G *15/00*

U.S. Cl. 355—14 **3 Claims**



1. A copying machine comprising: means to set the selected number of copies to be made by the apparatus, means to drive an electrostatographic surface a plurality of times successively from a charging station through an exposure station to a developing station, means to render at least one of said stations inoperative for a period at the start of the copying run in order to allow all parts of the apparatus to reach operative conditions, a plurality of microswitches, and means to actuate each microswitch in turn during each copying cycle of the machine, said means to render one of said stations inoperative including one of said microswitches, said period ending when said one microswitch is first actuated during a copying run.

3,976,375

ELECTROSTATIC COPYING MACHINE

Takaji Kurita, Kawachinagano, and Susumu Tanaka, Sakai, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Dec. 26, 1973, Ser. No. 427,857

Claims priority, application Japan, Dec. 30, 1972, 48-3805

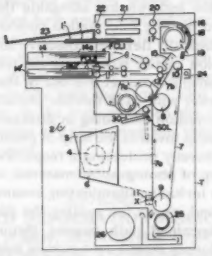
Int. Cl.² G03G *15/26*

U.S. Cl. 355—14 **17 Claims**

1. In an electrostatic copying machine of the type including an endless belt having an outwardly facing electrophotosensitive surface; means for supporting said endless belt for rotation about an endless path including a portion providing a flat belt surface; means for driving said belt about said endless path in a predetermined direction; corona discharge means for charging said electrophotosensitive surface of said belt and positioned upstream of said flat belt surface relative to said predetermined direction; total surface exposure means positioned adjacent said flat belt surface for exposing the total surface of an original and projecting an image thereof onto a predetermined portion of said flat belt surface after charging thereof by said corona discharge means; means positioned for feeding a transfer sheet to a location adjacent said endless belt; transfer means positioned adjacent said location for transferring said projected image from said belt surface to said transfer sheet; means for transporting said transfer sheet having said image thereon away from said endless belt; and copy operation control means for controlling the operation of said belt driving means, said corona discharge means and said total surface exposure means; the improvement wherein:

said endless belt is formed by joining opposite ends of a length of belting at a joint extending transverse to said predetermined direction;

said endless belt has a circumferential length equal to a first integral multiple greater than one of a first distance, said first distance being equal to a dimension of a first size transfer sheet plus the length of an interval between transfer sheets when said copying machine continuously operates, and said circumferential length being equal to a second integral multiple greater than one of a second distance, said second distance being different from said



first distance and equal to a dimension of a second size transfer sheet plus the length of an interval between transfer sheets when said copying machine continuously operates;

transfer sheet selection means coupled to said feeding means for selectively feeding said first size transfer sheets or said second size transfer sheets to said location; and

said copy operation control means comprises:

first size control means, connected to and operable by selection of said transfer sheet selection means, and connected to said belt driving means, said corona discharge means and said total surface exposure means for charging and exposing first length portions of said electrophotosensitive surface, each said first length portion being equal to said dimension of said first size transfer sheet;

second size control means, connected to and operable by selection of said transfer sheet selection means, and connected to said belt driving means, said corona discharge means and said total surface exposure means for charging and exposing second length portions of said electrophotosensitive surface, each said second length portion being equal to said dimension of said second size transfer sheet; and

each said first and second size control means including positioning means, connected to and operable by said transfer sheet selection means, and connected to said

belt driving means for positioning a leading edge of one of a respective said first or second length portions at a predetermined position upstream of said corona discharge means upon actuation of a copying operation.

3,976,376

PROTECTING STRIPS OF PHOTOGRAPHIC FILM

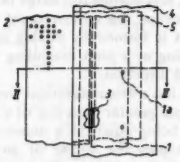
Friedrich Hujer, Grunwald, Germany, assignor to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed Sept. 18, 1975, Ser. No. 614,635

Claims priority, application Germany, Sept. 25, 1974, 2445830

Int. Cl.² G03B *1/00*

U.S. Cl. 355—133 **7 Claims**



5. In an installation for making prints from exposed photographic film and adapted to process a film strip structure comprised of a strip of photographic film comprised of a series of frames, an information carrier strip secured to the strip of photographic film and running alongside the strip of photographic film and bearing information concerning the frames, and a pair of elastically flexible protective strips each secured to the information carrier strip along the length of the information carrier strip at a respective one of the two faces of the information carrier with each flexible protective strip in normal unflexed condition extending in direction from the information carrier strip towards the strip of photographic film and overlying and thereby protecting a respective one of the two faces of the strip of photographic material, in combination: a printing station including illuminating means for illuminating the film strip; and means for guiding the film strip structure along a predetermined path passing through said printing station and including means upstream of said printing station for bending the protective strips away from the respective opposite faces of the film strip so that the film strip passes through the printing station not covered by the protective strips whereby the illuminating light of said illuminating means can pass through the film strip without being blocked by the protective strips.

3,976,377

METHOD OF OBTAINING THE DISTRIBUTION PROFILE OF ELECTRICALLY ACTIVE IONS IMPLANTED IN A SEMICONDUCTOR

Chung Pao Wu, Trenton; Edward Curtis Douglas, Princeton Junction, and Charles William Mueller, Princeton, all of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Feb. 3, 1975, Ser. No. 546,778

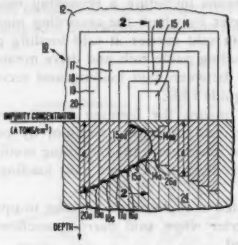
Int. Cl.² G01B *9/02*; G01R *31/26*

U.S. Cl. 356—36 **10 Claims**

1. In a method of obtaining the distribution profile of electrically active ions implanted into a semiconductor, the improvement comprising:

providing an integral target of said semiconductor having a plurality of doped regions of different known background impurity concentrations of one type conductivity, respectively, formed therein, each of said doped regions having a substantially uniform background impurity concentration and having a surface comprising a portion of the surface of said integral target, and

ion implanting ions of an opposite type conductivity through the surface of said integral target and simulta-



neously into each of said doped regions to form a P-N junction in each of said doped regions.

3,976,378

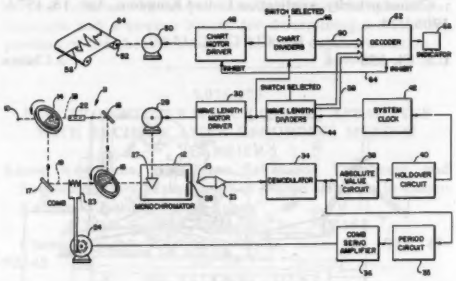
APPARATUS FOR MONITORING THE SELECTION OF CHART RECORDING AND WAVELENGTH SCANNING SPEEDS IN A RADIANT ENERGY ANALYZER

Stanley L. Pratt, 5331 Walter St., Riverside, Calif. 92504

Filed Nov. 11, 1974, Ser. No. 522,648

Int. Cl.² G01J *3/42*

U.S. Cl. 356—96 **9 Claims**



4. In a radiant energy analyzer having a radiant source, a monochromator and a wavelength scanning mechanism therefor, and chart recording means for moving a marker in relation to chart paper along an abscissa scale and ordinate scale for recording a waveform spectrum of a sample, the combination comprising:

a system clock having an output of a predetermined frequency;

a first frequency responsive drive motor for driving said wavelength scanning mechanism for continuously varying the wavelength output of said monochromator at various wavelength scan speeds;

a second frequency responsive drive motor in said chart recording means for driving one of said marker and chart paper along the abscissa with respect to the other of said marker and said chart paper;

a first set of frequency dividers switch selectable to place a frequency divider thereof in series between said system clock output and said first drive motor, said first set of frequency dividers having predetermined frequency dividing values for wavelength scan speed selection;

a second set of frequency dividers switch selectable to place a frequency divider thereof in series between said first set of frequency dividers and said second drive motor, said second set of frequency dividers having predetermined frequency dividing values for abscissa scale expansion selection; and

decoding means coupled to said first and second sets of frequency dividers and responsive to the selection of a

divider in one of said sets for ascertaining the validly selectable dividers in the other of said sets and for generating an output representative thereof.

3,976,379

INTERFEROMETERS

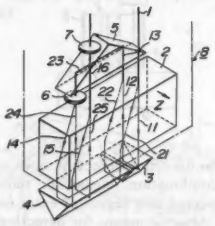
Tadashi Morokuma, Toyko, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Dec. 26, 1973, Ser. No. 428,899

Claims priority, application Japan, Dec. 28, 1972, 48-2471; Apr. 26, 1973, 48-48056; May 11, 1973, 48-52397; June 28, 1973, 48-73171; June 30, 1973, 48-73851

Int. Cl.² G01B 9/02

U.S. Cl. 356—106 R 14 Claims



1. An interferometer for precise determination of lengths of objects, comprising a light source; various optical elements, including a beam splitter for splitting the beam of light incident thereon from said light source into a measuring light beam and a reference light beam, said beams having a mutually orthogonal polarization; a plurality of retroreflectors classified into two groups, both groups having at least one retroreflecting element, all of said retroreflectors in both groups being mechanically connected for common movement; the retroreflectors in one group being independently movable relative to the retroreflectors in the other group; said retroreflectors redirecting both light beams through said beam splitter such that said light beams are recombined so as to emerge from said beam splitter following a common path; at least one bilateral reflector for redirecting the recombined light beam to be incident again on said beam splitter at a location distinct from the location wherein said recombined beam emerged, whereupon said recombined beam is split again into a second measuring beam and a second reference beam which, in turn, are incident on said retroreflectors; after at least one passage through said at least one bilateral reflector a further recombined beam emerges from said beam splitter; and means for detecting interference existing in said further recombined beam incident thereon; said various optical elements being so situated that each measuring beam and each reference beam suffers the same total number of passes through all said retroreflectors and the same total number of passes through all of said at least one bilateral reflector; the total number of passes made by said second measuring beam by said retroreflectors that constitute one of said groups is different from the number of passes made by said second reference beam through said retroreflectors that constitute said one group.

3,976,380

HOLOGRAPHIC ARRANGEMENT FOR TESTING MATERIALS WITHOUT DESTROYING SAME

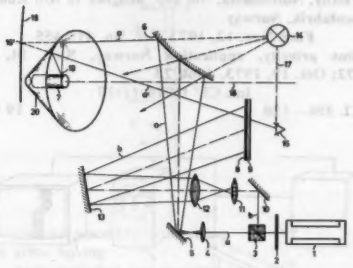
Hans Rottenkolber, Amerang, and Hans Steinbichler, Riedering, both of Germany, assignors to Opto-Produkte AG, Zurich, Switzerland

Filed Mar. 11, 1974, Ser. No. 450,106

Claims priority, application Germany, Mar. 13, 1973, 2312435

Int. Cl.² G01B 9/02

U.S. Cl. 356—109 7 Claims



1. A holographic arrangement for measuring irregular deformations, comprising a light source and a body of rotation located in concentric relationship with respect to an object and having a reflecting surface which corresponds to the object in a simplified form and is adapted to reflect rays which come from a virtual light source, are incident on the object, are reflected from the latter and pass through an observation point and whose virtual points of reflection lie on an ellipsoid whose focuses coincide with the virtual light source and the observation point, in the case of which the object lies on a median perpendicular of a line connecting the light source and the observation point.

3,976,381

METHOD OF DEFORMATION MEASUREMENT

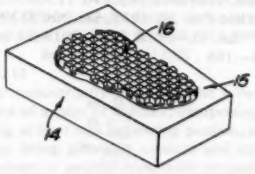
Colin Alexander W..ker, 265 Churchill Drive, Glasgow, G11 7HF, and James McKelvie, 2 Waterside Gardens, Carmunnock, Glasgow, both of Scotland

Filed Jan. 20, 1975, Ser. No. 542,687

Claims priority, application United Kingdom, Dec. 11, 1974, 53670/74

Int. Cl.² G01B 9/02

U.S. Cl. 356—109 2 Claims



1. A method of measuring in-plane deformation in the surface of an article a structure under test, comprising the steps of providing a master-grid having a grid pattern in relief, coating the surface of the unloaded article or structure with a layer of adhesive material, transferring an impression of the master-grid to the adhesive layer, thereby forming a test-grid on said surface which is a faithful reproduction of the master-grid; loading the article or structure to deform the test-grid,

making an impression of the deformed test-grid in a curable shape-retentive material and curing same thus forming a cast replica of the deformed test-grid; illuminating the cast replica with coherent light, forming an interference pattern by selecting two combining beams of light diffracted from the illuminated cast replica, making a record of said interference pattern, and determining the surface deformation of the article or structure from said record.

3,976,382

PROCEDURE AND APPARATUS FOR DETERMINING THE GEOMETRICAL SHAPE OF A SURFACE

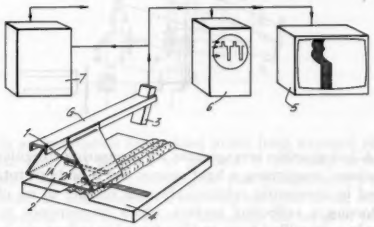
Ola Westby, Nordosletta, Norway, assignor to A/S Kongsberg . Vapenfabrik, Norway

Filed Nov. 12, 1973, Ser. No. 415,455

Claims priority, application Norway, Nov. 14, 1972, 4112/72; Oct. 19, 1973, 4060/73

Int. Cl.² G01B *11/30*

U.S. Cl. 356—120 **19 Claims**



9. Apparatus for determination of the geometrical shape of a surface, in particular on objects to be machined, welded, measured or inspected, said apparatus comprising:

a. a source of electromagnetic radiation arranged to flood irradiate said surface;

b. a radiation shield opaque to radiation from said radiation source and having an edge located closer to the surface than to said radiation source for partly intercepting said radiation and thereby generating a sharp contour line corresponding to said edge between irradiated and shielded regions of said surface; and

c. detection means for detecting the form of said contour line as an indication of the shape of said surface in the direction of said contour line.

3,976,383

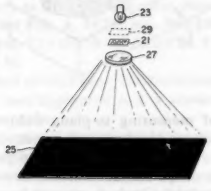
VISUAL METHOD OF LOCATING FAULTS IN PRINTED CIRCUIT BOARDS

Oliver Albert Olsen, Old Bridge, N.J., assignor to The Bendix Corporation, Teterboro, N.J.

Filed Feb. 28, 1975, Ser. No. 553,943

Int. Cl.² G01B *9/08*; G01N *21/16*

U.S. Cl. 356—166 **7 Claims**



1. A method of visually detecting defects in a printed circuit on a printed circuit board, comprising preparing a mask with a light blocking pattern corresponding to the desired printed circuit, illuminating the printed circuit board through the mask with a light of a color complimentary to the color of the printed circuit board and with the light blocking pattern in registry with the printed circuit, and inspecting the printed circuit board for light reflected from defects in the printed circuit not present in the light blocking pattern on the mask.

3,976,384

METHOD AND APPARATUS FOR DETECTING TIMBER DEFECTS

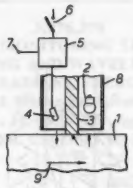
Peter Charles Matthews, Poole, and Brian Herbert Beech, Broadstone, both of England, assignors to Plessey Handel und Investments A.G., Zug, Switzerland

Filed Jan. 16, 1975, Ser. No. 541,573

Claims priority, application United Kingdom, Jan. 18, 1974, 2472/74

Int. Cl.² G01N *21/16*

U.S. Cl. 356—200 **10 Claims**



3. Apparatus for detecting defects in sawn or planed timber comprising, in combination, means for radiating light into timber to be inspected at a region of entry on the surface of the timber, light detector means for detecting light emerging from the timber on the same surface as the region of entry but at a location spaced-apart from the region of entry and for providing a first electrical signal which reflects a defect in the timber, means for providing a second electrical signal and comparator means for comparing the first electrical signal with the second electrical signal to produce an output signal related to the physical character of the timber.

3,976,385

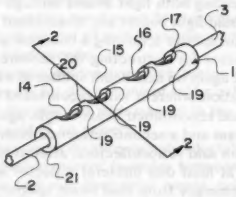
METHOD AND APPARATUS FOR SPLICING LINES

Henry Edward Klopfer, Sunnyvale, Calif., assignor to Raychem Corporation, Menlo Park, Calif.

Filed Oct. 9, 1974, Ser. No. 513,307

Int. Cl.² B25G *3/28*; F16G *11/00*

U.S. Cl. 403—284 **5 Claims**



1. A mechanical connection comprising, in combination:

a generally tubular, deformable housing said housing forming a line passageway therein, said housing having first and second end openings therein adapted for the admittance of at least one line, said passageway being of slightly larger diameter than said lines to be admitted;

at least one aperture formed in said housing and axially spaced from said end openings, said aperture intersecting said line passageway and having a sharp tapered edge

formed at said intersection between said aperture and said line passageway; said aperture being an excision extending through the exterior of said housing and being formed along an axis transverse to and laterally spaced from the exterior of said housing,

at least one line axially disposed in said housing passageway;

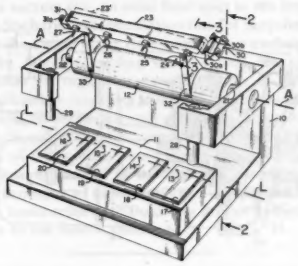
non-perforating deformations formed in said housing such that a point of said housing opposite each of said aperture is deformed inwardly and the portion of said line in registration therewith is deformed such that said line projects into said aperture and engages an interface of said aperture with said housing, and said point of said housing oposite each of said apertures is deformed to a distance from said aperture which is less than the diameter of said line disposed within said housing.

3,976,386

DRILL HEAD GUIDING CONTROL FOR MULTIPLE DRILLS

William F. Marantette, and Ruth B. Marantette, both of 20624 Earl St., Torrance, Calif. 90503

Filed Mar. 25, 1975, Ser. No. 561,853
Int. Cl.² B23B *39/18, 47/00*
U.S. Cl. 408—43 **4 Claims**



1. A drill head guiding control for multiple drills comprising, in combination:

a. a base frame for supporting a work surface;

b. an elongated head member supporting a series of drills;

c. a torque tube having an axis parallel to and spaced from a line passing through said series of drills, said torque tube being mounted to said frame for rotation about its axis;

d. connecting means laterally extending from adjacent opposite peripheral ends of said torque tube and coupled adjacent to opposite end portions of said member respectively such that rotation of said torque tube swings said head through an arc towards said work surface, the stiffness of said torque tube assuring that the opposite end portions of said elongated head member will simultaneously move through precise equal distances;

e. a pair of spaced, parallel guide rails secured to said frame in a position normal to said work surface; and

f. rail engaging means secured adjacent to opposite ends of said elongated head member positioned to engage said guide rails when said head arcuately swings from a first position to a second position, said connecting means including a lost motion coupling means at the coupling points to said head such that said head can move rectilinearly in the direction of the rails upon further arcuate movement of said torque tube towards a third position.

3,976,387

HOLE SAW DRILL AND ARBOR ASSEMBLY

Fred Segal, 545 Fairhill Drive, Akron, Ohio 44313

Filed June 2, 1975, Ser. No. 583,204
Int. Cl.² B23B *51/04*
U.S. Cl. 408—204 **8 Claims**

1. A hole saw assembly, comprising;

A. an arbor having

1. a body with first and second ends, and

2. a spindle projecting axially from said first end of said body;

B. an elongate pilot drill having

1. one end movably received within said body of said arbor, and

2. its opposed end projecting axially from said second end of said body of said arbor;

C. stop means

1. secured at least partially internally of said body of said arbor, and

2. encircling a portion of said pilot drill;

D. tension means

1. carried by said pilot drill and disposed internally of said body of said arbor, and

2. contacting said stop means;

E. a collar fixed to said pilot drill intermediate its ends and having cam surfaces thereon; and

F. an elongate cylindrical cutting member having

1. cam means carried internally thereof for camming engagement with the cam surfaces of said collar to lock said pilot drill and said cylindrical cutting member and to urge said pilot drill away from said arbor against the force of said tension means upon relative rotation between said cutting member and said pilot drill.

3,976,388

CONDUIT DEBURRING TOOL

George E. Webb, 2300 Lakeside Drive, Orlando, Fla. 32803

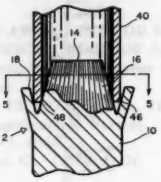
Filed Sept. 18, 1975, Ser. No. 614,500
Int. Cl.² B23B *51/00*
U.S. Cl. 408—211 **7 Claims**

1. A tool for concurrently deburring the inner and outer edges of the end of a tube or the like, comprising:

a body having at least one projecting portion, said projecting portion being generally conical and symmetrically disposed about a central axis, said projecting portion extending outward from said body and having a generally circular smaller end at its outermost extremity with the diameter of said end substantially smaller than the inside diameter of the tube to be deburred; and

a circular rim surrounding the base of said conical projecting portion and symmetrically disposed about said central axis, said rim having a generally conical interior surface intersecting with the exterior surface of said conical projecting portion, said exterior conical surface of said pro-

jecting portion and said interior surface of said rim diverging with respect to said intersection of said surfaces, said intersection forming a circle having a diameter essentially equal to the mean diameter of the tube to be deburred, said exterior conical surface having a length greater than the length of said interior conical surface whereby said conical projecting portion projects outward with respect to said rim,



said interior conical surface and said exterior conical surface forming a tube-end contacting area, said surfaces being serrated;

whereby said conical projecting portion serves to guide the end of a tube into contact with said contacting area and to safely maintain such contact, and whereby relative rotation of said area with respect to a tube end in contact with said area causes the inner and outer edges thereof to be concurrently deburred.

3,976,389

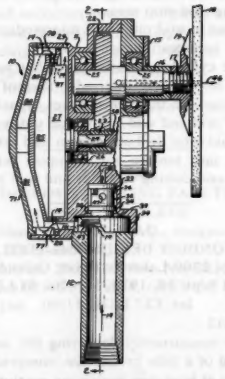
PRESSURIZED GAS ENGINE

James V. Theis, Jr., Delray Beach, Fla., assignor to Hollymatic Corporation, Park Forest, Ill.

Continuation-in-part of Ser. Nos. 405,092, Oct. 10, 1973, and Ser. No. 464,364, April 26, 1974, abandoned. This application Feb. 28, 1975, Ser. No. 553,978

Int. Cl.² F01B *25/06*

U.S. Cl. 415—25 **5 Claims**



1. A pressure gas engine, comprising: an inner first member having a generally circular periphery with first energy conversion means at said periphery for converting dynamic gas pressure to power; an outer second member closely surrounding said first member and having second energy conversion means adjacent to and facing said first conversion means also for converting dynamic gas pressure to power, the energy conversion means in one said member comprising an arcuately adjacent series of gas nozzles exhausting toward the other energy conversion means to provide a substantially straight line blast of gas into said other energy conversion means; a pressurized gas supply passage means to said nozzles; control means for said pressurized gas comprising a valve seat in said passage means and a force movable valve movable toward and away from said seat to control the gas flow through said passage means; means for diverting a portion of said pressurized gas from its supply passage means to the back side of said movable valve opposite the seat to provide valve closing back pressure on said valve and through a venting bleed valve comprising a vent valve seat in a bleed passage leading from said opposite side of said valve to the exterior and a movable vent valve member movable into and away from engagement with said vent valve seat; centrifugally responsive means rotatable with said rotor for moving said vent valve member toward said vent valve seat on increasing speeds of said rotor, thereby increasing and decreasing the valve closing back pressure on said movable valve to control the gas supply to said nozzles; and supplemental resilient means for providing additional valve closing back pressure on said movable valve.

3,976,390

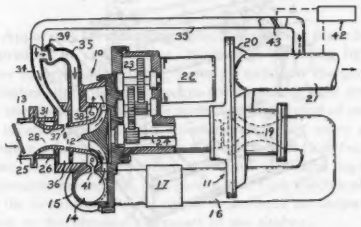
MEANS FOR CONTROLLING FLOW INSTABILITY IN CENTRIFUGAL COMPRESSORS

David H. Silvern, Hollywood, and Stanley J. Minton, Woodland Hills, both of Calif., assignors to Chicago Pneumatic Tool Company, New York, N.Y.

Filed Dec. 23, 1974, Ser. No. 535,163

Int. Cl.² F04D *17/12, 27/02*

U.S. Cl. 415—53 R **3 Claims**



1. In a centrifugal air compressor including a first stage of compression comprising a first rotor having an inlet, a discharge volute connected to a discharge end of the rotor, a primary inlet passage, and a nozzle passage connecting the primary inlet passage with the inlet of the rotor; and a second stage of compression comprising a second rotor having an inlet connecting with a discharge end of the volute, and having a discharge end connecting with a demand outlet line; the improvement represented by recirculation means for recirculating high energy air of compression from the demand outlet line of the second stage to the first stage when flow through the compressor drops below a predetermined value, said recirculation means comprising a loop conduit, a first collection chamber around the wall of the nozzle passage, a second collection chamber around the wall of the nozzle passage, the loop conduit having a connection at one end with the demand outlet and dividing at its other end into a pair of branch lines, a first of the branch lines connecting with the first collection chamber, a second of the branch lines connecting with the second collection chamber, a first group of orifices connecting the first collection chamber tangentially with the nozzle passage and normal to the direction of flow through the latter passage at a point between the throat of the nozzle passage and the inlet to the first rotor whereby a swirling motion is imparted to air flow through the nozzle passage, and a second group of orifices connecting the second collection chamber with the discharge volute in the direction of prevailing flow through the volute.

3,976,391

ROTODYNAMIC FLUID PUMPS

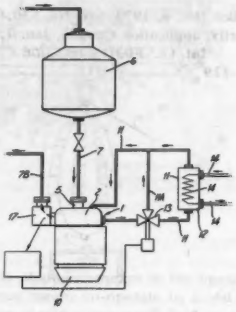
Forrest Thomson Randell, Glasgow, Scotland, assignor to Weir Pumps Limited, Glasgow, Scotland

Filed Apr. 30, 1975, Ser. No. 573,160

Claims priority, application United Kingdom, May 9, 1974, 20412/74

Int. Cl.² F04D 5/00

U.S. Cl. 415—53 R 3 Claims



1. A centrifugal pump including a casing housing an impeller having a suction eye, an axial fluid inlet to the impeller eye and a fluid discharge, a recirculation line for recycling leakage liquid from the casing to the fluid inlet, a heat exchanger in the recirculation line for cooling the recycled leakage liquid, control menas for regulating heat exchange in the heat exchanger, a chamber receiving leakage liquid from the recirculation line and having an internal volume sufficient to stabilise the leakage liquid, and a discharge passage from the chamber for delivery of the leakage liquid to the periphery of the fluid inlet and close to the eye of the impeller, the discharge passage being arranged to impart an axial component of flow to the leakage liquid relative to fluid flow in the fluid inlet so that disturbance to the flow is reduced.

3,976,392

PUMP DRIVE SHAFT SEALING ARRANGEMENT

Mauritz Bolin, Nordenskioldsvagen 27, 136 49 Handen, Sweden

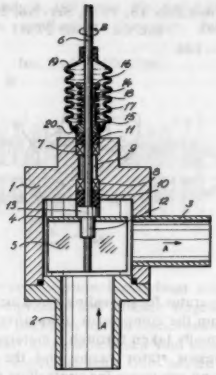
Filed Oct. 18, 1974, Ser. No. 515,952

Claims priority, application Sweden, Oct. 25, 1973, 7314528

Int. Cl.² F04D 29/08; F16K 41/00

U.S. Cl. 415—110 4 Claims

1. A pump to be used in a heating circulation system in boats, caravans, cars and the like having a low current supply for driving the pump, said pump including a pump housing defining a pumping chamber, a circulation liquid inlet conduit connected to said pumping chamber, a circulation outlet conduit connected to said pumping chamber, a pump impeller located in said pumping chamber for effecting the ciculation of the liquid in said system, a bore through one wall of said pump housing, a drive shaft extending through said bore and drivingly connected with said pump impeller to effect rotation of said impeller upon rotation of said drive shaft, drive means energized by said low current supply, said drive means being connected to said drive shaft at a location outside of said housing for effecting said rotation, means fixed in said bore for supporting said drive shaft relative to said pump housing, two sealing elements located at opposite ends of said bore and extending partly out of said bore, said sealing elements comprising a pair of bodies which, as seen in the direction of said drive shaft, respectively abut said supporting means on opposite surfaces thereof and also abut said drive shaft and the wall of said bore, two pressure elements disposed around said drive shaft, said pressure elements being movable in the direction of said drive shaft and respectively abutting the surfaces of said sealing elements opposite to the surfaces thereof which abut



said supporting means, and a spring means located outside said bore and arranged to press both of said pressure elements against said sealing elements, thereby to prevent leakage of the circulating liquid through said bore.

3,976,393

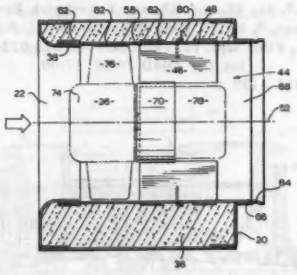
PORTABLE FAN HOUSING

Dale Leonard Milton Larson, Harrow, Canada, assignor to Candaian Hurricane Equipment Ltd, Harrow, Canada

Filed Aug. 27, 1975, Ser. No. 608,146

Int. Cl.² F04D 29/66, 29/52

U.S. Cl. 415—119 30 Claims



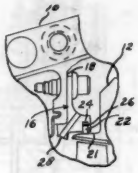
1. A barrel assembly for an axial flow fan comprising a sheet of flexible material, a body portion and a vane assembly, said body portion having a circular inlet and a barrel seat extending downstream from the periphery of said inlet, said vane assembly having a plurality of evenly spaced-apart radially extending vanes, said vanes each being of substantially equal radial length and each having a free end, the longitudinal axis of said vane assembly being coincident with the central axis of said inlet, said sheet of material being wrapped around said free ends of said vanes and said barrel seat, said barrel seat providing a seat which the formed tubular end of said sheet of material contacts, and means for retaining said sheet of material in position.

3,976,394

INTERSTAGE BLEED ASSEMBLY

David A. Tarter, Cincinnati, Ohio, and Jack L. Readnour, Fort Mitchell, Ky., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed July 18, 1975, Ser. No. 597,061
Int. Cl.² F04D 27/02
U.S. Cl. 415—144 2 Claims



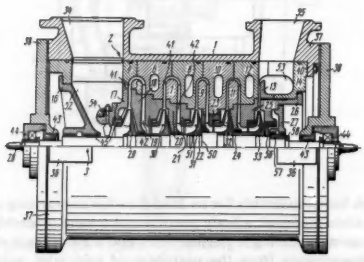
1. In an apparatus for providing bleed air to a plenum for air frame use from the compressor of an aircraft engine wherein the air is normally taken through a metering gap between the outer compressor stator casing and the inner compressor stator casing: an apparatus for controlling the flow of air from the compressor to the plenum, comprising: a two part sealing member secured to the outer compressor stator casing; said sealing member having a portion extending across said gap between the outer compressor stator casing and the inner compressor stator casing; means for providing a seal between said sealing member and said inner compressor stator casing; said sealing member having means for controlling the flow of air from said compressor to the air frame plenum.

3,976,395

MULTIPLE-STAGE CENTRIFUGAL COMPRESSOR

Igor Martynovich Kalnin, Ulitsa Kropotkinskaya, 26, kv. 13; Beniamin Lvovich Tsirlin; Elena Zalmanovna Bukhter, both of 9 Parkovaya ulitsa, 32, kv. 24; Alexandra Dmitrievna Terenina, ulitsa Argunovskaya, 18, kv. 120; Galina Ivanovna Eremkina, ulitsa Gvardeiskaya, 5, korpus 1, kv. 22, all of Moscow; Andrei Ivanovich Poteiko, ulitsa Studencheskaya, 17, kv. 48, and Khanon Yakovlevich Breslov, ulitsa Novatorov, 7, kv. 10, both of Kazan, all of U.S.S.R.

Filed Sept. 12, 1975, Ser. No. 613,022
Int. Cl.² F04D 29/42, 17/00
U.S. Cl. 415—199 A 2 Claims



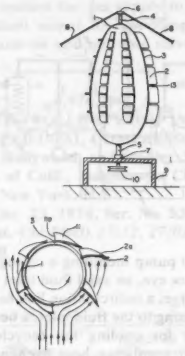
1. A multiple-stage centrifugal compressor without the horizontal joint comprising a casing; diaphragms interconnected into a package and forming a stator accommodated in said casing; stage impellers; a shaft mounting said stage impellers and constituting a rotor; labyrinth seal holders; said diaphragms have cylindrical holes for said labyrinth seal holders; the improvement of said compressor consists in that said cylindrical holes in the diaphragms have different diameters along the shaft axis, said diameters increasing in steps towards the end of the diaphragm package whereby said labyrinth seal holders are adapted to be inserted and/or removed from said one end of said diaphragm package.

3,976,396

DEVICE FOR CONVERTING FLUID FLOW INTO KINETIC ENERGY

Enrico Antogini, Wiregrass Farm, R.R. No. 3, Picton, Ontario, Canada

Filed Dec. 6, 1974, Ser. No. 530,406
Claims priority, application Canada, Jan. 7, 1974, 189513
Int. Cl.² F03D 9/00, 3/06
U.S. Cl. 416—119 14 Claims



1. A device for converting wind energy into rotational kinetic energy comprising a body mounted for rotation about a vertical longitudinal axis thereof, said body being open to the action of the wind, a plurality of horizontally spaced vertically extending vanes pivotably mounted on said body for rotation between an open position in which the vane extends outwardly from the body and a closed position in which the vane lies with one surface thereof adjacent the surface of the body, and a plurality of feather members spacedly mounted longitudinally of each vane and extending outwardly and transversely of the surface opposite to said one surface of said vane, said feather members being dimensioned to abut said body when said vane is in said open position to provide stop means for each vane, the centre of gravity of each vane being located at a position in the feather members such that on the rotational speed of the body reaching a preselected maximum all the vanes assume a position between the open and closed position.

3,976,397

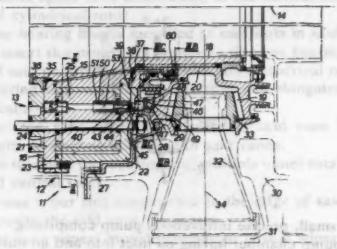
ROTARY ACTUATORS SUITABLE FOR BLADED ROTORS

John Owen Hunt, Hucclecote, England, assignor to Dowty Rotol Limited, England

Filed Mar. 29, 1974, Ser. No. 456,210
Claims priority, application United Kingdom, Apr. 18, 1973, 18734/73
Int. Cl.² B64C 11/40
U.S. Cl. 416—154 11 Claims

1. A rotary actuator fitted to a rotor having flow-varying blading for effecting adjustment of the blading, including two relatively-rotatable and co-axially-disposed main actuator components, each of said components carrying respective abutment means positioned in predetermined manner thereupon and one of the abutment means being axially-displaceable with respect to its component between an operative position and an inoperative position, loading means comprising a plurality of balls, and a frusto-conical surface, carried by one of said components, with which said balls are co-operable for ensuring, during rotation of the rotor, that the balls, under centrifugal force acting upon them, bias the displaceable

abutment means in a direction towards said operative position, the two abutment means being so disposed with respect to their components that during operation of the actuator with



said displaceable abutment means in the operative position, the two abutment means co-operate to arrest relative rotational movement of said components only upon said components reaching a predetermined relative rotational position.

3,976,398

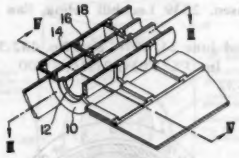
VANED IMPELLER WHEEL FOR TORQUE CONVERTER

Yasuhiko Hyakutake, Mitaka, and Takao Andou, Yokohama, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Division of Ser. No. 496,188, Aug. 9, 1974, abandoned. This application June 10, 1975, Ser. No. 585,518

Int. Cl.² F01D *5/04*

U.S. Cl. 416—180 **3 Claims**



1. A vaned element for a hydraulic torque transmitting device, including a series of vane members, each of said vane members having a blade portion, a supporting shell portion extending from the blade portion, a cooling fin portion extending from the supporting shell portion, a shrouded ring portion extending from the cooling fin portion and stepped portions between the core ring and blade portion and between the cooling fin and shrouded ring portion, respectively, said vane members being assembled with the end of the core ring portion of each vane member engaging with the stepped portion between the core ring portion and blade portion of an adjacent vane member, with the end of the supporting shell portion of each vane member engaging with the stepped portion between the blade portion and the supporting shell portion of an adjacent vane member, and with the end of the shrouded ring portion engaging with the stepped portion between the cooling fin portion and the shrouded ring portion of an adjacent vane member.

3,976,399

ROTOR OF DISC CONSTRUCTION FOR SINGLE-SHAFT GAS TURBINE

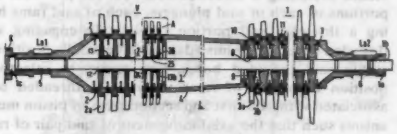
Otto Schmoch, Muhlheim-Ruhr, Germany, assignor to Kraftwerk Union Aktiengesellschaft, Berlin and Munich, Germany

Filed July 8, 1971, Ser. No. 160,832

Claims priority, application Germany, July 9, 1970, 2034088

Int. Cl.² F01D *5/06*

U.S. Cl. 416—201 R **7 Claims**



1. Rotor of disc construction for at least single-shaft gas turbines having compressor and turbine stages, comprising respective rotor disc packages for the compressor and turbine stages, a hollow shaft located between said compressor and turbine stages, and respective shaft stubs seated at the outer ends of the rotor disc packages at respective meshing centering ring gears secured against torsion, all strung together coaxially, and means for clamping the same together including a connecting rod extending centrally The and tubular 2 members located between the outer periphery of said connecting rod and the inner periphery of said rotor discs for maintaining elastic contact between said connecting rod and said discs during operation of the turbine, said intermediate members comprising axially divided shells surrounding said connecting rod and extending axially coextensively with a plurality of said discs, and at least one clamping ring clamping said shells together and bracing them against the outer periphery of said connecting rod.

3,976,400

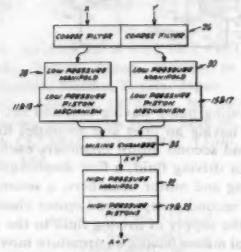
GRADIENT PUMP APPARATUS

Emery Major, Larkspur, Calif., assignor to Altex Scientific, Inc., Berkeley, Calif.

Filed Mar. 3, 1975, Ser. No. 554,407

Int. Cl.² F04B *1/12, 23/04*; **F01B** *31/14*; **F16J** *1/10*

U.S. Cl. 417—248 **12 Claims**



1. A positive displacement gradient pump for a first and second flowable material comprising:

a. rotatable shaft operated by a source of power

b. first piston means for pumping the first flowable material comprising a pair of piston mechanisms;

c. second piston means for pumping the second flowable material comprising a pair of piston mechanisms each of said first and second piston mechanisms including a piston, piston chamber, for guiding said piston's axial movement, ram axially aligned with said piston, plunger axially

aligned with said piston, said ram connected to the proximal end portion of said plunger such that axial movement of said distal end of said plunger causes said ram to tap said piston resulting in axial movement of said piston within said piston chamber.

d. first cam means, including a first cam rotated by said shaft, for operating said first and second piston means, and;

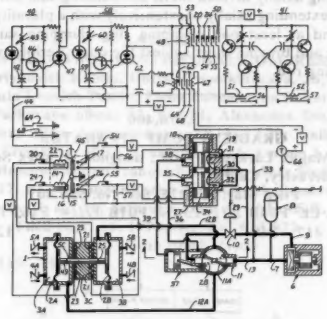
e. means for changing the volume output of said first and second piston means such that the total volumne output from said first and second piston means is constant, said means including a threaded bore on the proximal end portions of each of said plungers, each of said rams having a threaded end portion threadingly engaging said threaded bores, said rams adapted to be axially positioned within said threaded bores, and means to selectively position each pair of rams within said threaded bore associated with said first and second pairs of piston mechanisms such that the axial movement of said pair of rams upon rotation of said first cam causes said associated pairs of pistons to reciprocally travel within the range of zero to full stroke and the total stroke of said pistons in constant.

3,976,401

PUMP FOR ABRASIVE SLURRIES AND THE LIKE

Donald C. Mountain, 2812 King Road, N. Kingsville, Ohio 44068

Filed Jan. 2, 1975, Ser. No. 538,026
Int. Cl.² F04B *17/00, 39/08, 15/02;* **F01L** *25/08*
U.S. Cl. 417—393 **6 Claims**



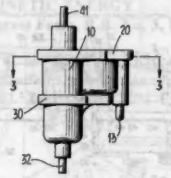
1. A reciprocating pump having first and second pumping chambers each having an inlet and an outlet for fluid to be pumped, first and second motor chambers each having inlet and an outlet for driving fluid, a first diaphragm common to the first pumping and motor chambers, a second diaphragm common to the second pumping and motor chambers, means for controlling the supply of driving fluid to the motor chambers, said control means having an armature movable to a first position for controlling the supply of driving fluid to said first diaphragm for its pumping stroke and to a second position for controlling the supply of fluid to the second diaphragm for its pumping stroke, a first electromagnetic coil for moving the armature to said first position, a second electromagnetic coil for moving said armature to said second position, each coil when energized being strong enough to hold the armature in its position when the other coil is simultaneously energized, and circuit means for energizing both coils during the pumping stroke of each diaphragm and for de-energizing the coil associated with each diaphragm at the end of its pumping stroke to initiate the pumping stroke of the other diaphragm.

3,976,402

INTRAVENOUS DELIVERY PUMP

Ingemar H. Lundquist, Oakland, Calif., assignor to Origo, Inc., Hayward, Calif.

Filed July 15, 1974, Ser. No. 488,580
Int. Cl.² F04B *21/02*
U.S. Cl. 417—566 **13 Claims**



1. A small, precise intravenous pump comprising:

a. a pump chamber having an inlet into and an outlet from the bottom thereof when the pump is in an operative position;

b. a plunger having an inner end portion projecting inwardly through a wall of said pump chamber adapted to be moved inwardly and outwardly therein, said plunger having an outer end portion which remains outside of said chamber and is adapted for engagement by a plunger actuating means;

c. a flexible sheath having the interior surface thereof disposed in close-fitting contact with said inner end portion of said plunger, said sheath having the outer end thereof in sealing engagement with the wall of said pump chamber, and said plunger and sheath being free of rubbing contact with the walls of said chamber;

d. a valve in said inlet and said outlet which consists of a soft resilient valve plate adapted to engage the interior ends of said ducts; and

e. weights adapted to force the plates against said inlet and said outlet when said pump is in a vertical position.

3,976,403

ROTARY VANE FLUID PRESSURE MACHINE

Robert L. Jensen, 2339 Lockhill Selma, San Antonio, Tex. 78230

Filed June 24, 1974, Ser. No. 482,362
Int. Cl.² F01C *21/16, 19/00*
U.S. Cl. 418—32 **10 Claims**

1. A rotary vane fluid pressure machine comprising:

a. a central shaft means mounted substantially at the center of,

b. a casing, the inner surface of said casing defining,

c. a cylinder means at a constant radius from central shaft having:

1. a shaft end of said cylinder, and

2. an exhaust end at the opposite end of said cylinder,

d. a one piece elongated cylindrical rotor rotatibly mounted off-center of said cylinder means, said cylindrical rotor being constructed with:

1. a contiguous solid integral shaft end,
2. a contiguous solid integral exhaust end, and
3. a central section intermediate said shaft end and said exhaust end,

e. multiple vanes having a first side and a second side secured to said central shaft, said multiple vanes projecting through,

f. uniform space slots constructed in the central section of said cylindrical rotor,

g. vane bearing inserts mounted in said slots in said rotor,

h. an insert slot projecting between said vane bearing insert and said uniform spaced slots in said cylindrical rotor for securing said vane bearing insert in said elongated cylindrical rotor,

i. cast iron vane bearings mounted in said vane bearing inserts contacting each side of said vanes,

j. vane retainers for securing said multiple vanes rotatibly on said central shaft,

k. a vane wiper slot constructed in the edge of said vanes opposite the said vane retainers,

l. edge vane wipers movably mounted in said wiper slots,

m. a clockwise exhaust valve assembly operably mounted adjacent said exhaust face plate,

n. a counter-clockwise exhaust valve assembly operably mounted adjacent said exhaust face plate,

o. control pressure means for selectively controlling said exhaust valves, and

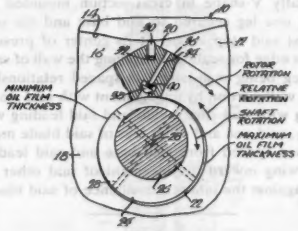
p. control valve means for selectively applying said control pressure to said control pressure means.

3,976,404

LUBRICATION OF COMPRESSION SEALS IN ROTARY ENGINES

Thomas M. Dennison, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Feb. 19, 1975, Ser. No. 551,177
Int. Cl.² F01C *21/04*
U.S. Cl. 418—88 **8 Claims**



1. In a rotary engine, the combination of

a housing,

a main shaft extending through said housing,

a rotor journalled on said main shaft, said rotor having a bore receiving said shaft,

means for lubricating the interface of said bore and said shaft,

at least one compression seal carried by said rotor and sealingly engaging said housing, and

a lubrication conduit in said rotor extending from said bore to a surface of said rotor adjacent said compression seal,

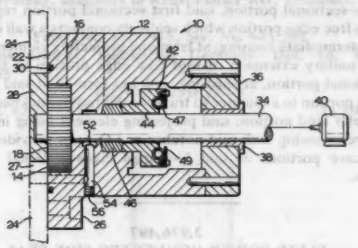
whereby relative rotation between said rotor and said shaft during operation of said engine will generate a pumping action at said interface to drive small amounts of lubricant through said lubrication conduit to said rotor surface to lubricate said seal.

3,976,405

PUMP

Kenneth Daniel Geiger, Port Credit; Steven Joseph Horvath, Mississauga; Paul Niessen, Waterloo, and Theodore Joseph Seymour, Oakville, all of Canada, assignors to Cominco Ltd., Trail, Canada

Filed Oct. 29, 1974, Ser. No. 518,850
Int. Cl.² F01C *19/00;* **F04C** *27/00*
U.S. Cl. 418—102 **3 Claims**



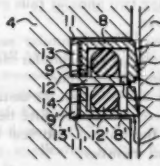
1. An improved pump for molten lead or lead alloy metal comprising, in combination, a casing defining a chamber having an inlet and an outlet, coacting gears with shafts journalled for rotation within said casing to move molten metal from said inlet through the chamber to said outlet, one of said shafts extending through said casing for clearance to means for driving said shaft and the gear mounted thereon, a packing gland encircling a portion of said shaft extending through the casing and defining a uniform open clerance annulus about the shaft spaced from the gear mounted thereon whereby said molten metal leaking from the chamber along the shaft flows into the said annulus, a heat resistant porous packing encircling and engaging the shaft and interposed axially between the casing and the packing gland, means connecting said packing gland to said casing whereby the packing gland compresses the said packing against the shaft, and cooling means formed in said packing gland in proximity to the annulus for cooling said annulus directly thereby solidifying within said annulus molten metal leaking past said packing, whereby said solidified metal provides an effective seal and shaft bearing, said cooling means comprising a recess formed in said packing gland, conduit tubing mounted in said recess for conducting a coolant therethrough to cool the packing gland, and plate securement means mounting said tubing within said recess.

3,976,406

OIL SEAL MEANS OF A ROTARY PISTON ENGINE

Yoshio Sasaki, Toyota, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Sept. 18, 1974, Ser. No. 507,238
Claims priority, application Japan, May 20, 1974, 49-56350
Int. Cl.² F01C *19/00;* **F04C** *15/00, 27/00*
U.S. Cl. 418—142 **2 Claims**



1. An oil seal means of a rotary piston engine comprising two annular oil seal grooves provided in a sidewall portion of a rotor and arranged in close proximity with respect to each other and substantially coaxial with respect to each other around the center of the rotor, said oil seal grooves defining

a relatively thin annular land portion disposed therebetween, two oil seal rings, one being mounted in each of said annular oil seal grooves, spring means provided in said annular oil seal grooves for applying a resilient force to said rings to urge the same outwardly from said grooves, said rings each having a substantially U-shaped cross section formed of a relatively thin first, second and third cross-sectional portion extending in the radial, axial and radial directions of the rotor, respectively, said first and third cross-sectional portions being connected to and supported by opposite ends of said second cross-sectional portion, said first sectional portion representing a free edge portion which sealingly contacts a wall of a side or intermediate housing, at least one projecting element which is a unitary extension of said free edge portion of said first sectional portion, at least two notches formed at said annular land portion in a manner to traverse the radial thickness of the annular land portion, said projecting element being in engaging relationship with said notches and O-rings provided in the concave portions of said U-shaped cross-sectional oil seal rings.

3,976,407

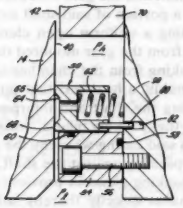
FLUID POWER CONVERTER SIDE SEAL

Charles R. Gerlach, San Antonio, Tex., assignor to Rineer Hydraulics, Inc., Corpus Christi, Tex.

Filed May 12, 1975, Ser. No. 576,913

Int. Cl.² F01C *1/00, 19/08;* **F03C** *3/00;* **F04C** *15/00*

U.S. Cl. 418—142 **3 Claims**



1. In a fluid power converter having a rotor and a stator member, the members being concentrically mounted and rotatable one with respect to the other about a common axis and having coacting sides, the improvement in seal means between said sides comprising,

an annular retainer ring sealably connected to the first of said members,

an annular first seal positioned between the coacting sides of said members and coaxially positioned about the retainer ring,

means securing said annular seal to said first member for preventing rotation relative to said first member, but allowing movement of said annular seal towards said second member,

said first seal including two annular rails protruding toward said second member,

resilient means between said annular seal and said first member yieldably urging said annular rails of said annular seal toward said second member,

said seal being of a width less than the distance between the coacting sides whereby high pressure between the coacting sides acts on the end of said seal to urge said seal towards the second member,

said seal including a passageway extending from between said rails to a position between the coacting sides, and

a second seal means between the outside of the retainer ring and the inside of said annular seal whereby the total loading force on the first seal is borne by both rails but only the inner rail acts as a seal.

3,976,408

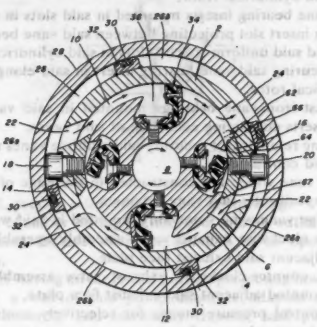
FLUID DRIVEN MOTOR HAVING IMPROVED BLADE CONSTRUCTION

Marion A. Garrison, Denver, Colo., assignor to Empire Oil Tool Company, Denver, Colo.

Filed Jan. 31, 1975, Ser. No. 545,866

Int. Cl.² F01C *5/02;* **F03C** *3/00;* **F04C** *5/00*

U.S. Cl. 418—153 **12 Claims**



1. A fluid motor or pump comprising a housing having a bore, a rotor body mounted for rotation in said bore and defining therewith an annular space, longitudinally extending separator strips mounted on said housing in said bore and dividing said annular space into at least two chambers, inlet ports opening through said housing to each chamber adjacent the trailing edge of each separator strip considered in the direction of rotor rotation, outlet ports opening through said housing to each chamber spaced circumferentially a short distance from the leading edge of each separator strip, a plurality of circumferentially spaced longitudinally extending grooves formed in the rotor surface, each groove having a base and a leading wall portion, stop means carried on said leading wall portion in radially outwardly spaced relationship to said base and extending into said groove, a resilient blade of substantially V-shape in cross-section mounted in each groove with one leg secured to said base and the other leg urged against said stop means at its center of pressure and having a free edge for sealingly engaging the wall of said bore, said other leg being maintained in spaced relationship with said leading wall portion by engagement with said stop means and defining with said stop means and said leading wall portion a cavity, said one and other legs of said blade meeting at a curved apex spaced from said base and said leading wall portion allowing inward displacement of said other leg into said cavity against the inherent resilience of said blade.

3,976,409

TIRE CURING PRESS CENTER MECHANISM

John E. Athey, Akron, Ohio, assignor to McNeil Corporation, Akron, Ohio

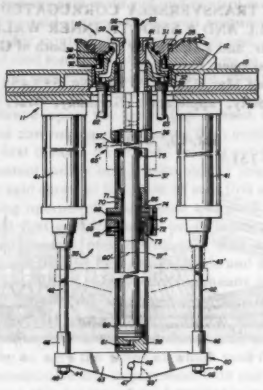
Filed Nov. 7, 1974, Ser. No. 521,924

Int. Cl.² B29H *5/02, 5/06*

U.S. Cl. 425—48 **15 Claims**

1. A center mechanism for a press for shaping and curing tires comprising, post means carrying an upper bladder clamping ring, a lower bladder clamping ring through which said post means extends, bladder means having beads sealingly engaged by said upper and lower bladder clamping rings to form a chamber for curing medium, piston means carried by said post means, cylinder casing means including sealing means engaging said post means, said sealing means constituting spaced seals having a drain interposed therebetween, a first chamber in said cylinder casing means on one side of said sealing means communicating with the chamber formed in said diaphragm, a second chamber in said cylinder casing

means on the other side of said sealing means in which said piston means is housed, and means for supplying fluid to the



second chamber to control the position of said piston means therein while maintaining the fluid isolated from the curing medium.

3,976,410

EXTRUSION PROCESSES AND APPARATUS THEREFOR

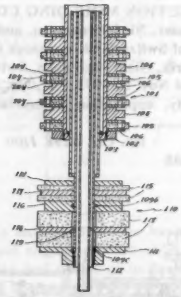
James Jack, Mistley, and Derek Cory Gray, Colchester, both of England, assignors to Bakelite Xylonite Limited, London, England

Filed Oct. 15, 1974, Ser. No. 514,802

Claims priority, application United Kingdom, Oct. 15, 1973, 48048/73

Int. Cl.² B29D *7/20;* **B29C** *17/07*

U.S. Cl. 425—71 **11 Claims**



1. In an apparatus for use in the production of a quenched tube of organic thermoplastics polymeric material, comprising an extrusion die for downwardly extruding a tube of organic thermoplastics material, a first component consisting of an assembly of at least two calibrating discs which are disposed perpendicularly to the axis of the tube and which are mutually coaxial with each other as well as with the tube and which assembly is supported by a structure attached to and supported by the extrusion die, a second component consisting of a seal supported by the die, means for passing liquid continuously into the interior of the thermoplastics tube at a level between the bottom calibrating disc and the seal, means for continuously extracting the liquid at a selected level above the top calibrating disc, and means for controlling the pressure of gas which lies in the space bounded by the die, the inner surface of the tube and the liquid surface, the improvement whereby at least a part of at least those peripheral portions of said components, which during operation contact the inner wall of the tube are made of a liquid absorbent material.

3,976,411

APPARATUS FOR CALIBRATING SYNTHETIC-RESIN TUBING

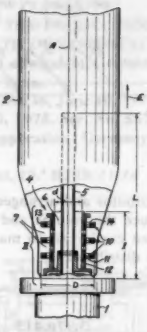
Herbert Rahlfs, Troisdorf-Sieglar, and Udo Hardt, Eitorf, both of Germany, assignors to Reifenhauser KG, Troisdorf, Germany

Filed Dec. 17, 1975, Ser. No. 641,361

Claims priority, application Germany, Dec. 18, 1974, 2459785

Int. Cl.² B29D *23/04*

U.S. Cl. 425—72 R **11 Claims**



1. An apparatus for shaping synthetic-resin tubing issuing continuously from a nozzle, said apparatus comprising:

means for withdrawing gas from the interior of said tubing at a location spaced downstream from said nozzle;

an elongated tube in said tubing extending downstream from said nozzle and terminating upstream of said location to define an elongated chamber opening downstream, said tube being formed with a plurality of longitudinally spaced arrays of throughgoing holes;

a plurality of transverse calibrating disks each secured to said tube immediately downstream of a respective one of said arrays and each forming with the next upstream disk a compartment communicating with said chamber through the respective array of holes;

means including a plurality of independently adjustable shutters for varying the flow cross-section of said holes and thereby controlling fluid flow between said compartments and said chamber; and

means for introducing a cooling gas into said tubing at said nozzle, whereby said cooling gas contacts said tubing and passes downstream around said disks and through said compartments and chamber to be aspirated at said location.

3,976,412

APPARATUS FOR MAKING FIBROUS SHEET MATERIAL

Brian William Attwood, Bristol, and Denis Raymond Hicklin, Bath, both of England, assignors to Karl Kroyer St. Anne's Limited, Bristol, England

Filed June 6, 1975, Ser. No. 584,256

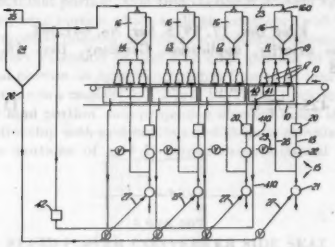
Claims priority, application United Kingdom, July 16, 1974, 31389/74

Int. Cl.² B29J *5/02*

U.S. Cl. 425—81 **6 Claims**

1. Apparatus for dry forming a layer of fibres on a forming surface comprising a plant for breaking up raw fibrous material, a forming surface, a distributor for distributing fibres on to the forming surface to form a layer thereon, and a fan air

duct system for conveying fibres produced by the plant in a stream of carrier air to the distributor, characterized in that a primary separator device is located in the system between the



plant and the distributor and arranged to remove part of the carrier air to reduce the volume and rate of flow of the remaining fibre-laden carrier air to match the operational requirements of the distributor.

3,976,413

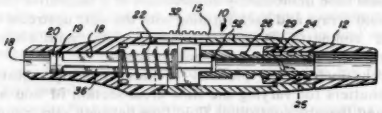
ADJUSTABLE FISH BAIT FORMING DEVICE

Samuel Joseph Popeil, Chicago, Ill., assignor to Popeil Brothers, Inc., Chicago, Ill.

Continuation-in-part of Ser. No. 487,853, July 12, 1974, abandoned. This application Jan. 9, 1975, Ser. No. 539,929

Int. Cl.² A01K *97/00*

U.S. Cl. 425—117 18 Claims



1. An adjustable fish bait forming device comprising, in combination,

a body having a tip,

means defining a cylinder in the tip,

a piston slidably mounted in the tip,

pusher means associated with said piston for actuating the piston toward the end of the tip,

adjustment means for positioning the pusher at variable starting points within the tip,

said adjustment means including a rotatable adjustment knob rotatably mounted to the body at the end opposite the tip,

and further including means threadedly interconnected with said adjustment knob and disposed axially between said knob and said piston for adjusting the position of the piston,

whereby the length of a cylindrical slug of bait may be predetermined by said adjustment means, the tip inserted into a bait dough, and the same ejected by the pusher means.

3,976,414

APPARATUS FOR THE PRODUCTION OF DOUBLE-WALLED SYNTHETIC PLASTIC TUBES HAVING A TRANSVERSELY CORRUGATED OUTER WALL AND A SMOOTH INNER WALL

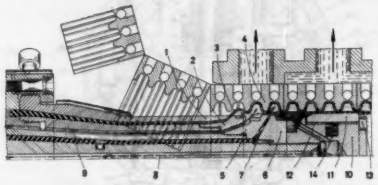
Wilhelm Hegler, and Ralph-Peter Hegler, both of Goethestr. 2, 873 Bad Kissingen, Germany

Filed Mar. 18, 1975, Ser. No. 559,455

Claims priority, application Germany, Mar. 22, 1974, 2413879

Int. Cl.² B29D *23/04*

U.S. Cl. 425—131.1 16 Claims



1. An improvement in an apparatus for forming an outer corrugated tube wherein the corrugations of said tube abut an inner tube within said corrugated tube, said apparatus comprising means for forming an outer corrugated tube about a die and within cooperating mold halves, means for forming an inner tube about a central mandrel operatively associated with said die and within said corrugated tube which improvement comprises means for urging said inner tube against the corrugations of said outer corrugated tube, said means comprising a presser floatingly mounted on an extension of said central mandrel to move freely in any direction in a plane normal to the axis of the extruding die and said presser having means urging said presser outward toward the inner wall of said inner tube.

3,976,415

INJECTION MOULDING CONTROL

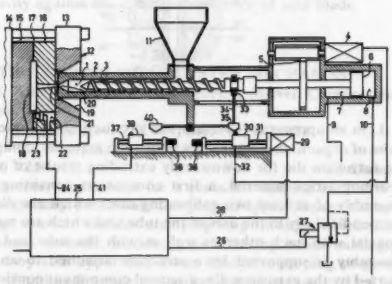
Hans Ulrich Hauser, Niederweningen, and Eduard Hartmann, Urdorf, both of Switzerland, assignors to Bucher-Guyer AG Maschinenfabrik, Niederweningen, Switzerland

Filed Nov. 5, 1973, Ser. No. 412,787

Claims priority, application Switzerland, Nov. 10, 1972, 16381/72

Int. Cl.² B29F *1/06*

U.S. Cl. 425—145 7 Claims



1. Injection molding apparatus comprising a pair of molds defining a mold cavity and movable relative to each other to define therebetween a mold gap, injection means in communication with said mold cavity including a plasticizing screw which is both longitudinally and rotatably movable to process and inject moldable material into said mold cavity, means

operatively connected to said screw for rotatively driving said screw, means operatively connected to said screw for longitudinally driving said screw, sensing means mounted on said molds for sensing said mold gap and control means operatively connected to said sensing means and responsive to said sensing means for controlling operation of said rotative driving means and said longitudinal driving means to thereby control operation of said plasticizing screw to effect injection of a controlled amount of molding material into said mold cavity in dependence upon the mold gap sensed by said sensing means, said control means including limit switch means which comprise first contact means and second contact means, said second contact means being mounted for longitudinal movement with said screw at least one of said first and said contact means being operatively connected with said rotative driving means, said first contact means being located in the path of said second contact means with said first and said second contact means thereby being engageable and disengageable in order to control said rotative driving means to start and stop rotation of said screw, said control means including means responsive to said sensing means for varying the position of said first contact means in accordance with said sensed mold gap thereby to vary the point at which said first and second contact means come into engagement with each other in order to determine the dosage of said moldable material injected into said mold cavity.

3,976,416

ADJUSTABLE DIE CLOSING UNIT FOR INJECTION MOLDING MACHINE

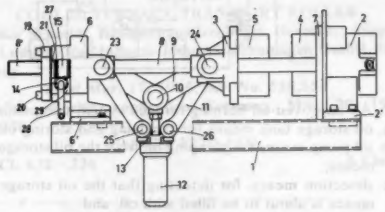
Karl Hehl, Arthur-Hehl-Strasse 32, 7291 Lossburg, Germany

Filed July 19, 1974, Ser. No. 490,087

Claims priority, application Germany, July 20, 1973, 2336991

Int. Cl.² B29F *1/06*; B30B *1/16*, *15/04*

U.S. Cl. 425—242 R **10 Claims**



1. In an injection molding machine having a knee linkage type die closing unit engaging a movable die carrier and a thrust stock with the end points of its knee linkage, thereby opening and closing the movable die carrier against a stationary die carrier which faces the former on the opposite side of the thrust stock, a device for fine-adjusting the longitudinal distance between the thrust stock and the stationary die carrier, comprising in combination:

a generally flat supporting member carrying the thrust stock and the stationary die carrier;

at least two parallel guide spars engaging and supporting the movable die carrier and extending longitudinally between the thrust stock and the stationary die carrier, whereby the latter serve as opposite guide spar supports;

means for fixedly attaching the guide spars to one of said two guide spar supports;

means for threading the other guide spar support longitudinally toward and away from said first-mentioned guide spar support; and wherein the threading means includes:

a threaded length portion on each guide spar reaching through a guide bore in the associated guide spar support;

an internally threaded adjustment member rotatably engaging each guide spar threaded length;

means for rotating said adjustment members in synchronism;

a recess in the guide spar support having opposing axial faces confining the adjustment members therebetween;

means for axially clamping each adjustment member between the opposing axial faces of the recess, so as to block it against rotation; and

means for also clamping the threads of each adjustment member against the guide spar threads, under the action of said axial adjustment member clamping means, so as to axially and rotationally block the mating threads against each other, thereby setting the position of the second guide spar support relative to the guide spar free of any operational backlash.

3,976,417

APPARATUS FOR THE PRODUCTION OF CERAMIC PLATES WITH ORNAMENTAL SHAPES

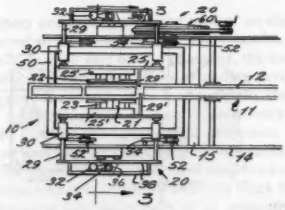
Hans Lingl, Neu-Ulm-Ludwigsfeld, Germany, assignor to Lingl Corporation, Paris, Tenn.

Division of Ser. No. 478,036, June 10, 1974. This application Mar. 10, 1975, Ser. No. 557,222

Claims priority, application Germany, Aug. 17, 1973, 2341631

Int. Cl.² B28B *11/14*

U.S. Cl. 425—307 **10 Claims**



1. Apparatus for producing ornamentally shaped tiles comprising

a. means for conveying a continuous clay column in an upright position from an extrusion press,

b. punching means movable through a side face of said column to a predetermined depth perpendicular to the direction of conveyance of said column,

c. means for moving said punching means perpendicular to the direction of conveyance of said column,

d. cutting means for severing a section of said continuous column acted upon by said punching means from the rest of said column, and

e. means for moving said punching and cutting means with substantially the same velocity as the velocity of conveyance of said column so that there is no relative movement between said punching means and said column while said punching means acts on said column.

3,976,418

APPARATUS FOR GUSSETING CONTINUOUS LENGTHS OF TUBULAR MATERIAL

Joel M. Leathers, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

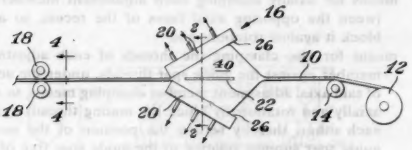
Division of Ser. No. 301,679, Oct. 27, 1972, Pat. No. 3,897,530. This application Apr. 16, 1975, Ser. No. 568,500

Int. Cl.² B29C *17/02*

U.S. Cl. 425—388 **3 Claims**

1. In apparatus for gusseting a generally collapsed, continuous length of tubular material, the cooperative combination of elements comprising, means for continuously advancing the

tube, means for pinching the advancing tube to seal a certain pressure environment, within the tube, a gusseting station comprising opposed, spaced apart vacuum suction faces operative in an area prior to said pinching means, the vacuum suction faces selectively engaging opposite exterior surface

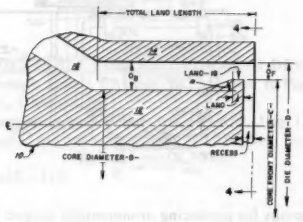


areas of the tube for pulling such surface areas apart to open the tube for gusseting, and being non-contacting with the area of the tube selected for forming the gusset, said vacuum suction faces being movable, and means to move said vacuum suction faces in the direction of travel of the tube.

3,976,419
DIE RESTRICTIONS TO OBTAIN SMOOTH SURFACES ON FOAM EXTRUDATES

Ernst Egli, Lichtensteig, Switzerland, and Larry A. Thomas, Aurora, Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Division of Ser. No. 301,526, Oct. 27, 1972, Pat. No. 3,876,740. This application Sept. 18, 1974, Ser. No. 507,008
Int. Cl.² B29F *3/04*
U.S. Cl. 425—467 **2 Claims**



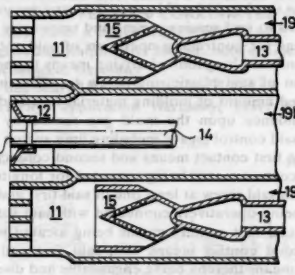
1. A die for the extrusion of a mixture of thermoplastic material and blowing agent comprising an inner portion and an outer portion, said portions so disposed to produce an annular space, the die orifice of which is recessed from the exit face plane of said outer portion by offsetting said exit face plane with respect to the exit face plane of said inner portion along the transverse axis of said die, said orifice containing a tapered projection formed on said second portion which extends radially into said annular space at an angle between about 5 and 40° and ends in a land, said projection reducing the cross-section of said orifice relative to said annular space.

3,976,420
METHOD AND APPARATUS FOR BURNING FUELS

Yasuro Takahashi, and Hisao Yamamoto, both of Nagasaki, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Japan

Filed Mar. 3, 1975, Ser. No. 554,703
Claims priority, application Japan, Mar. 5, 1974, 49-24778
Int. Cl.² F23C *5/00*
U.S. Cl. 431—10 **13 Claims**

1. A process for burning fuels comprising feeding and burning in a combustion zone an air-fuel premixture of a low fuel concentration formed by premixing a fuel with combustion air in an amount larger than the theoretical air amount necessary for combustion of said fuel, and simultaneously feeding separately and burning in the vicinity of said combustion zone a fuel and combustion air in an amount smaller than the theoretical air amount necessary for combustion of said fuel, or feeding separately and burning in the vicinity of said combus-

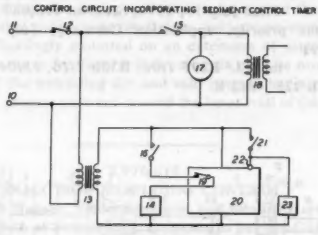


tion zone an air-fuel premixture of a fuel and a part of combustion air supplied in said amount and the remainder of said combustion air.

3,976,421
APPARATUS FOR SEDIMENT CONTROL IN OIL BURNER INSTALLATIONS

Eugene T. Lee, 11 Mountainview Ave., and Leonard J. Box, 1363 Pleasant Valley Way, both of West Orange, N.J. 07052

Filed Dec. 30, 1974, Ser. No. 537,436
Int. Cl.² F23N *1/00*
U.S. Cl. 431—29 **6 Claims**



1. An improved oil burning furnace system comprising:
a. oil storage tank means for receiving and storing oil;
b. oil pump means for pumping oil from the oil storage tank means;
c. detection means, for detecting that the oil storage tank means is about to be filled with oil; and
d. protection means, connected to the detection means and responsive to detection that the oil storage tank means is about to be filled with oil, for preventing operation of the oil pump means for a predetermined time interval commencing with detection that the oil storage tank means is about to be filled with oil and being of sufficient duration to allow sediment, stirred up by filling the oil storage tank means with oil, to settle.

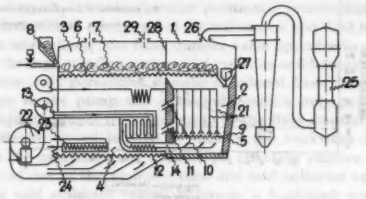
3,976,422
APPARATUS FOR RECLAMATION OF RESINOUS MOULDING MIXES

Ryszard Motyczynski; Tadeusz Franaszek; Mieczyslaw Kurzydlo, and Jerzy Polaczek, all of Krakow, Poland, assignors to Przedsiebiorstwo Projektowania i Wyposazania Odlewni "Prodlew", Warsaw, Poland

Filed Feb. 27, 1975, Ser. No. 553,546
Claims priority, application Poland, Mar. 4, 1974, 169283
Int. Cl.² F27B *15/00*
U.S. Cl. 432—58 **6 Claims**

1. An apparatus for reclamation of resinous molding mixes comprising three fluidizing chambers including a heating

chamber, a firing chamber, and a cooling chamber, a common housing for said three chambers, means for supplying a mix to be treated to said heating chamber at one end thereof, said heating chamber being disposed above the other two chambers, a fluidizing conveyor separating said heating chamber from the two chambers therebelow and forming a bottom for said heating chamber on which the mix is conveyed from the supplying means along said conveyor while being first cooled by air flowing upwardly from the cooling chamber and then heated by flow of combustion gases upwardly from the firing chamber, a closure at the other end of the heating chamber for feeding the mix to the firing chamber at one end thereof by gravitional introduction thereinto, said firing chamber having



a bottom including a fluidizing grate, means for introducing fluidizing air into said firing chamber below said grate, said mix traveling along said grate to the other end of the firing chamber, pipe means disposed directly above said grate for feeding a fuel mixture in direct proximity to said grate, said firing chamber having, at the other end thereof, a wall separating the firing chamber from the cooling chamber, said wall having aperture means for passage of the mix to said cooling chamber and a further fluidizing conveyor in said cooling chamber for transport of this mix through said cooling chamber to a discharge outlet provided in said housing.

3,976,423

COOLED FURNACE TRANSPORT ROLLER

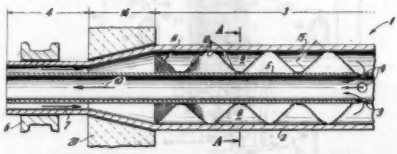
Theodor Schmidt, Heiligenhaus-Isenbugel, Germany, assignor to Ludwig-Ofag-Indugas Industrieofenanlagen GmbH, Germany

Filed Mar. 17, 1975, Ser. No. 558,651

Claims priority, application Germany, Mar. 20, 1974, 2413270

Int. Cl.² F27D *3/00*

U.S. Cl. 432—236 **6 Claims**



1. A cooled furnace transport roller comprising a hollow cylindrical roller having an intermediate furnace space portion adapted to be positioned in the furnace and a stub shaft portion adjacent each end adapted to extend out of the furnace, a hollow interior tube located within said cylindrical roller and spaced inwardly from the interior thereof and extending from said tube shaft portion through said furnace space portion and defining a gas coolant supply flow path from said stub shaft portion to said furnace space portion between its exterior and the interior of said cylindrical roller and also defining a coolant gas return flow passage on its interior which communicates with said gas coolant supply flow path, and a cooling insert of a heat conductive metal disposed between said cylinder roller and said hollow interior tube at least in said furnace space portion, said cooling insert comprising a cylindrical tubular mesh of wave-shaped configuration.

3,976,424

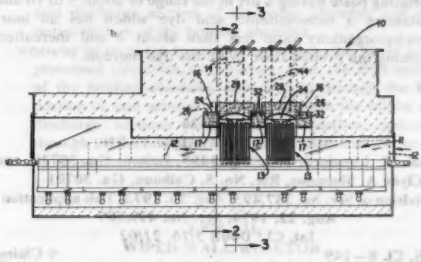
REFRACTORY ROOF CONSTRUCTION FOR THE HEATING CHAMBER OF AN INDUSTRIAL FURNACE

Kim R. Krubsack, Watertown, Wis., assignor to Sola Basic Industries, Inc., Milwaukee, Wis.

Filed Feb. 18, 1975, Ser. No. 550,229

Int. Cl.² F23M *5/02*; **F27D** *1/02*

U.S. Cl. 432—247 **4 Claims**



1. In a refractory construction for the roof of an elongated heating chamber of an industrial furnace, said chamber having vertical side walls on each side of said chamber, the combination of a plurality of transverse rafters extending across said chamber and spaced from each other longitudinally along said chamber, each rafter comprising a pair of arch bricks, each sloping upwardly toward the longitudinal centerline of said chamber, each of said arch bricks having an outer end engaging and held by its respective side wall, said arch bricks having inner ends adjacent said centerline, an arch key brick for each rafter located between said inner ends of its respective arch bricks and engaged thereby, and a plurality of roof bricks extending longitudinally of said chamber between successive rafters, said roof bricks having ends resting on and supported by the pair of rafters between which it extends, said roof bricks having an outer one on each side of said chamber, said arch key brick has a top surface which with the inner ends of said arch bricks define a first horizontal surface and there is a notch in the upper surface of each outer roof brick adjacent said first horizontal surface which defines a second horizontal surface lower than said first horizontal surface.

3. In a refractory construction for the roof of an elongated heating chamber of an industrial furnace, said chamber having vertical side walls on each side of said chamber, the combination of a plurality of transverse rafters extending across said chamber and spaced from each other longitudinally along said chamber, each rafter comprising a pair of arch bricks, each sloping upwardly toward the longitudinal centerline of said chamber, each of said arch bricks having an outer end engaging and held by its respective side wall, said arch bricks having inner ends adjacent said centerline, an arch key brick for each rafter located between said inner ends of its respective arch bricks and engaged thereby, and a plurality of roof bricks extending longitudinally of said chamber between successive rafters, said roof bricks having ends resting on and supported by the pair of rafters between which it extends, said roof bricks having an outer one on each side of said chamber, said outer ones of the roof bricks between each pair of rafters being spaced from the side walls of the chamber to define a space into which a removable electrical element supporting plug is located between said outer ones of said roof bricks and the respective side wall.

CHEMICAL

3,976,425
PRINTING PROCESS FOR ACRYLIC FIBERS

Eichiro Ueno, Wakayama; Hideo Kawasaki, Moriyama, and Syozo Shigita, Hirakata, all of Japan, assignors to American Cyanamid Company, Stamford, Conn.

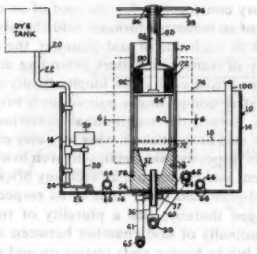
Filed Dec. 13, 1973, Ser. No. 424,409
Int. Cl.² D06P 1/30
U.S. Cl. 8—62 6 Claims

1. A process for dyeing acrylic fiber and modacrylic fiber of at least about 40 weight percent acrylonitrile and substantially free of acid dye sites which comprises printing said fiber with a printing paste having a pH in the range of about 5 to 10 and containing a monosulfonic acid dye which has an inorganicity/organicity ratio less than about 4 and thereafter steaming the printed fiber to fix the dye thereon.

3,976,426
METHOD OF DYEING YARN

Leslie E. Lunsford, P.O. Box 1483, Dalton, Ga. 30720, and Clyde A. Simmons, Rte. No. 5, Calhoun, Ga. 30701

Division of Ser. No. 387,493, Aug. 10, 1973. This application Aug. 22, 1974, Ser. No. 499,787
Int. Cl.² D06B 5/16, 21/02
U.S. Cl. 8—149 9 Claims



1. The method of packaging and dyeing yarn which comprises forming a yarn package by winding the yarn back and forth spirally around a vertical axis, and forcing dye radially outwardly solely through the lower portion of the package to dye a limited portion of the lower end of the package.

3,976,427
ORGANIC COMPOUNDS

Hans-Peter Baumann, Munchenstein, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

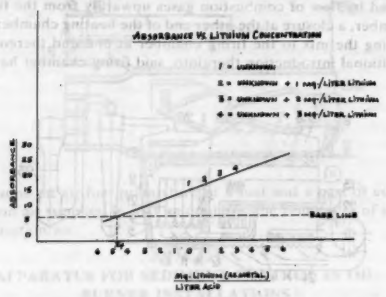
Continuation-in-part of Ser. No. 256,029, May 23, 1972, Pat. No. 3,807,953. This application Nov. 30, 1973, Ser. No. 420,723
Int. Cl.² D06P 1/86, 5/04
U.S. Cl. 8—173 18 Claims

1. A composition comprising a dye carrier and an emulsifier, the dye carrier comprising 30 to 60 parts by weight of diphenyl, 5 to 25 parts by weight of methyl biphenyl and 5 to 25 parts by weight of fluorene, provided the total of said parts by weight does not exceed 100, the emulsifier being present in an amount from 5 to 30 weight % based on said carrier.

3,976,428
PROCESS FOR QUANTITATIVE ANALYSIS

John Link, St. Louis, Mo., assignor to Petrolite Corporation, St. Louis, Mo.

Filed Apr. 5, 1972, Ser. No. 241,321
Int. Cl.² G01N 21/24
U.S. Cl. 23—230 R 5 Claims



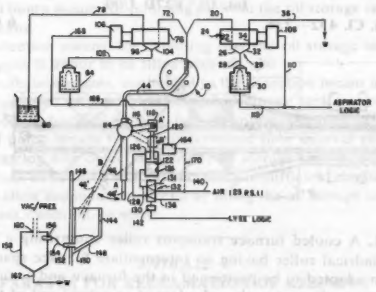
1. A process for making a rapid quantitative determination of the amount of corrosion inhibitor in a metal pickling system which comprises

1. adding a predetermined amount of easily analyzable lithium salt as an auxiliary chemical to said system,
2. analyzing said system for the concentration of lithium salt by means of spectroscopic analysis and
3. correlating the ratio of said lithium salt to said corrosion inhibitor so as to make a quantitative determination of its concentration in said system, thereby facilitating control and therefore the effectiveness of said corrosion inhibitor in said system.

3,976,429
BACKWASH SYSTEM FOR DILUTING APPARATUS

Guenter Ginsberg, Miami, Fla., assignor to Coulter Electronics, Inc., Hialeah, Fla.

Filed Oct. 16, 1973, Ser. No. 406,788
Int. Cl.² G01N 31/00, 1/00, 1/10
U.S. Cl. 23—259 7 Claims



1. A backwash system capable of being operationally coupled for use with a diluting system of the type providing a plurality of dilutions of differing concentration from a single fluid sample and which diluting system includes, a source of fluid sample and a source of diluent, a fluid transfer valve coupled to the sources and having first and second portions, the first portion for receiving and isolating therein an amount of the fluid sample, the first portion of said fluid transfer valve being capable of combining the amount of sample with a first

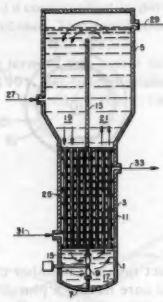
volume of diluent by being in fluid flow communication with said diluent source to produce a precise desired first dilution, and the second portion capable of receiving and isolating therein an amount of the first dilution for making a second solution, an aspirator including an aspirator tube introducible into the fluid sample and coupled to the first portion; said backwash system arranged to pass diluent from the source thereof to the first portion of the fluid transfer valve and to and through the aspirator tube at a predetermined stage during operation of said system, said backwash system comprising, a pump having a chamber capable of storing and delivering a known volume of diluent, a first fluid conduit leading from the diluent source to said pump and a second fluid conduit leading from said pump to the fluid transfer valve, a valve including an actuator therefor positioned intermediate said first and second conduits and diluent source and fluid transfer valve respectively, the fluid transfer valve operable to control flow through said first and second conduits and between a first position only permitting passage of diluent from the diluent source to the pump and a second position only permitting passage of diluent from the pump to the fluid transfer valve, a collector vessel located to receive the backwash diluent from the aspirator tube, means for effecting relative movement of one of the aspirator tube and said collector vessel to cause said collector vessel to assume a backwash receiving condition with respect to the aspirator tube and a control mechanism operating to deliver diluent as backwash only when the collector vessel is in said backwash receiving condition.

3,976,430

FORCED CIRCULATION COOLING CRYSTALLIZER

James E. Houston, Grand Island, N.Y.; Reynard W. Gingrich, Fort Erie, Canada, and Earl A. Schilt, Kenmore, N.Y., assignors to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Filed Aug. 5, 1974, Ser. No. 494,933
Int. Cl.² B01D *9/02*
U.S. Cl. 23—273 R **4 Claims**



1. An integral forced circulation cooling crystallizer apparatus consisting of, in vertical disposition:

a. an upper liquid holding chamber having liquid inlet and liquid outlet and having a partition means vertically disposed therein providing an inlet section and an outlet section, said partition means being positioned so as to permit liquid flow over the top of said partition means between said sections at the upper region and prevent liquid flow between said sections at the lower region;

b. a heat exchange chamber comprising a multiplicity of separate vertically disposed tubular elements, a liquid inlet and outlet to permit the flow of a heat exchange liquid only through the extra-tubular portion of said heat exchange chamber, and a multiplicity of horizontally disposed baffles adapted to direct the flow of said heat exchange liquid upward in a horizontally alternating path through the extra-tubular portion of said heat exchange chamber;

c. a lower pump chamber, having partition means vertically disposed to provide an intake section and a discharge section and having a pump means disposed therein to provide forced circulation of the liquid to be processed between said intake section and said discharge section;

the tubular elements of said heat exchange chamber being disposed such that a first portion of said tubular elements provide direct liquid communication between said inlet section of the holding chamber and said intake section of the pump chamber; and a second portion of said tubular elements provide direct liquid communication between said discharge section of the pump chamber and said outlet section of the holding chamber;

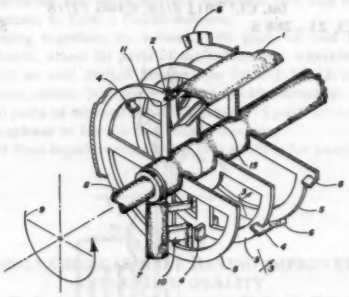
whereby in response to said pump means, the liquid to be processed circulates, in sequence, from the inlet section of the holding chamber, downwardly through the first portion of said tubular elements, through the intake and discharge sections of the pump chamber, upwardly through the second portion of the tubular elements, to the outlet section of the holding chamber.

3,976,431

WIPED-WALL REACTOR

Beryl Aaron Boggs; Laszlo Joseph Balint; Patrick William Ager, and Edward Jerome Buyalos, all of Chester, Va., assignors to Allied Chemical Corporation, New York, N.Y.

Filed May 6, 1975, Ser. No. 575,000
Int. Cl.² B01J *1/00;* **B01D** *1/22*
U.S. Cl. 23—285 **12 Claims**



1. In an essentially horizontal totally enclosed cylindrical wiped-wall polymer reactor having essentially horizontal polymer flow, said reactor having a pool of said polymer in its lower portion and having driven wheels to create high polymer surface area said high surface area to facilitate evaporation of volatiles from said polymer, the improvement comprising

a free-wheeling drag wheel driven by said driven wheels,

a wiping means mounted on said driven wheels and actuated by said drag wheel so as to wipe the entire internal circumference of said cylindrical reactor,

whereby said drag wheel generates a force to urge said wiping means against said internal circumference of said reactor, said force generated by the drag of said pool of said polymer on said drag wheel.

3,976,432

REACTOR HAVING AN AUSTENITE STEEL CATALYST FOR PURIFYING FLUE GAS

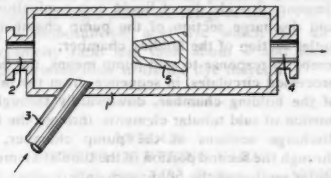
Ferdinand Schwarz, Vienna, and Erich Bauer, Unter-Eggendorf, both of Austria, assignors to Osterreichische Mineralolverwaltung Aktiengesellschaft, Vienna, Austria

Filed Aug. 17, 1973, Ser. No. 389,090

Claims priority, application Austria, Aug. 22, 1972, 7231/72

Int. Cl.² B01J *1/14, 23/74;* F01N *3/15*

U.S. Cl. 23—288 FC 5 Claims



1. An apparatus for the purification of waste flue gas comprising:

a casing having inlet and outlet means and a separate combustion air inlet means, and

a catalyst means constructed wholly of austenite steel contained in said casing, downstream from said separate combustion air inlet means, for the ignition of said flue gas.

3,976,433

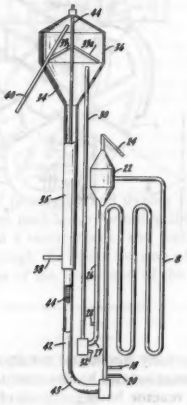
APPARATUS FOR CATALYTIC CONVERSION

George V. Lampadarios, Baltimore, Md., assignor to Atlantic Richfield Company, Philadelphia, Pa.

Filed Dec. 11, 1974, Ser. No. 531,578

Int. Cl.² B01J *8/18;* C10G *11/18*

U.S. Cl. 23—288 S 5 Claims



1. A catalytic chemical conversion unit comprising

a. a reactor column having a lower inlet and an upper outlet;

b. means for introducing a feed fluid into the lower portion of said reactor;

c. means for introducing finally divided solid catalyst into the lower portion of said reactor, provided that the cross-sectional area of said reactor column is maintained substantially constant from the first point at which said fluid and said catalyst are contacted to said reactor column outlet;

d. means for separating chemical reaction products from catalyst passing from the reactor outlet;

e. a generally vertical catalyst stripper for collecting separated catalyst;

f. means for introducing a stripping gas into said stripper to maintain an upper portion of the collected catalyst in a dense fluidized state and a lower portion of the collected catalyst in a compact phase;

g. catalyst lift means for conveying catalyst as a dispersed phase between the lower portion of the stripper and a catalyst regenerator;

h. means for introducing a lifting gas into said catalyst lift means;

i. means for introducing a regenerating gas into said regenerator to regenerate catalyst therein and maintain the catalyst in a dense fluidized state;

j. transfer means for passing regenerated catalyst between said regenerator and said reactor inlet and including means for causing catalyst to form a compact phase in the lower portion of said transfer means; and

k. control means comprising a pipe passing through said catalyst regenerator to said transfer means and vertically movable within said regenerator and said transfer means for introducing a fluidizing gas into said transfer means to vary the relative amounts of fluidized and compact catalyst in said transfer means to control the rate of catalyst flow to said reactor.

3,976,434

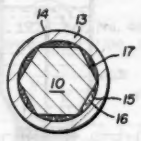
SAW AND IMPACT RESISTANT MEMBER

Warren M. Shwayder, 2335 E. Lincoln, Birmingham, Mich. 48007

Filed July 26, 1974, Ser. No. 492,191

Int. Cl.² B32B *15/16*

U.S. Cl. 29—191.2 2 Claims



1. A saw and impact resistant member comprising:

an elongated metal core having a plurality of generally flat longitudinal faces, the adjacent faces meeting at relatively sharp longitudinal edges to thereby define a core of polygonal cross-section;

a thin walled tubular metal sheath telescopically surrounding said core and being in contact with the core only at said relatively sharp core edges to center the core relative to the sheath;

a plurality of substantially identical longitudinal spaces each having a segment-shaped cross-section, each formed between the interior wall surface of said tubular sheath and one longitudinal face of said core;

said longitudinal spaces being filled with a matrix formed of closely packed hard particles such as metallic carbide or the like and a soft binder material;

said tubular sheath being closely fitted on said polygonal core to exclude both said binder and said hard particles therebetween except in said longitudinal spaces.

3,976,435

POROUS ELECTRODES AND ELECTROLYTIC CAPACITORS MADE THEREFROM

Gerhart P. Klein, Manchester, Mass., assignor to P. R. Mallory & Co. Inc., Indianapolis, Ind.

Division of Ser. No. 182,782, Sept. 12, 1971, abandoned, which is a continuation-in-part of Ser. No. 17,519, March 7, 1970, abandoned, which is a continuation-in-part of Ser. No. 810,405, Sept. 13, 1968, abandoned, which is a division of Ser. No. 552,312, May 23, 1966, Pat. No. 3,422,515. This application Nov. 2, 1973, Ser. No. 412,309

Int. Cl.² B22F *3/22*

U.S. Cl. 29—192 R 4 Claims

1. An electrical capacitor preform comprising a mass of tantalum powder held together in a predetermined shape by frozen water.

3,976,436

METAL OF IMPROVED ENVIRONMENTAL RESISTANCE

David R. Chang, Cincinnati, Ohio, assignor to General Electric Company, Cincinnati, Ohio

Filed Feb. 13, 1975, Ser. No. 549,769

Int. Cl.² B32B *15/00;* C22C *19/05*

U.S. Cl. 29—196.6 5 Claims

1. A metallic article comprising a substrate selected from the group consisting of Fe, Co and Ni base alloys, said substrate having diffused thereon an alloy consisting essentially of, by weight, 8–30% Al, 0.1–10% Hf, 0.5–20% of an element selected from the group consisting of Pt, Rh and Pd, up to 3% Y and the balance an element selected from the group consisting of Ni and Co.

3,976,437

COMPOSITION COMPRISING A METHYL PHENOL AND AN ETHER FOR GASOLINE FUELS

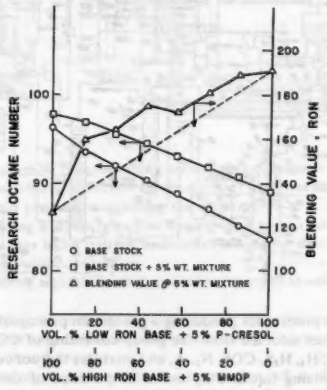
Jer-Yu Shang, Pittsburgh, Pa.; Barry A. Bisson, Wilmington, Del., and Raymond Wynkoop, Gladwyne, Pa., assignors to Sun Ventures, Inc., St. Davids, Pa.

Continuation-in-part of Ser. No. 265,850, June 23, 1972, Pat. No. 3,836,342, and a continuation-in-part of Ser. No. 440,619, Feb. 7, 1974, abandoned. This application Sept. 13, 1974, Ser. No. 505,820

The portion of the term of this patent subsequent to Sept. 17, 1991, has been disclaimed.

Int. Cl.² C10L *1/18*

U.S. Cl. 44—56 10 Claims



1. Composition, useful for increasing the research octane number of gasoline, comprising a mixture of a methyl-substituted phenol and a hydrocarbyl ether having at least one branched alkyl group and boiling below 460°F, said phenol and said ether each being present in amount sufficient to increase the research octane number of a hydrocarbon gasoline base stock having a research octane number in the range of 85 to 95.

3,976,438

GASOLINE ADDITIVE AND METHOD FOR MAKING SAME

Eugene H. Bay, Jersey Shore, Pa., assignor to Clifton McCleary, Jr., Washington, D.C.

Filed Sept. 12, 1975, Ser. No. 612,990

Int. Cl.² C10L *1/26*

U.S. Cl. 44—61 20 Claims

6. A method of making an additive for gasoline which improves the mileage per gallon of said gasoline when used to drive an automotive vehicle therewith comprising the steps of

a. immersing about 50 pounds of bituminous coal into a first mixture of about one pound of a carbide wherein said carbide is selected from the group consisting of alkali metal carbide, alkaline earth metal carbide, aluminum carbide and mixtures thereof, admixed with about 75 gallons of mineral spirits for a period of about 10 to about 30 hours,

b. removing said coal from said mixture and immersing said coal into a second mixture of about one pound of carbide and about 75 gallons of dialkyl ketone wherein each alkyl in said dialkyl ketone has from 1 to 12 carbon atoms, for a period of about 10 to about 30 hours,

c. removing said coal from said second mixture and immersing said coal into a third mixture of about one pound carbide and about 75 gallons of benzene for a period of about 10 to 24 hours,

d. combining said first and second mixtures,

e. removing said coal from said third mixture,

f. combining said third mixture with said first and second mixtures to form a fourth mixture,

g. mixing together, by volume, 100 parts of said fourth mixture, about 60 parts of dialkyl ketone, wherein each alkyl in said dialkyl ketone has from 1 to 12 carbon atoms, about 300 parts of orthodichlorbenzene, about 370 parts of mineral spirits and about 75 parts tri-o-cresyl phosphate to form a final liquid mixture,

h. said final liquid mixture being said additive for gasoline.

3,976,439

NON-LEADED GASOLINE HAVING IMPROVED ANTI-KNOCK QUALITY

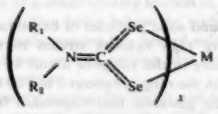
Wallace R. Loder, Jr., North Olmsted; Philip S. Fay, Lyndhurst, and Franklin Veatch, University Heights, all of Ohio, assignors to Standard Oil Company, Cleveland, Ohio

Filed Sept. 24, 1975, Ser. No. 616,389

Int. Cl.² C10L *1/24*

U.S. Cl. 44—68 7 Claims

1. A non-leaded gasoline composition for internal combustion engines containing from about 0.0625 to 1.0 grams of metal per gallon of fuel of a compound having the formula



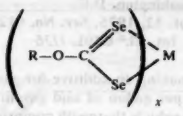
wherein M is a metal selected from the group consisting of nickel, zinc, copper, manganese, and iron, X is the valence state of the metal, and R_1 and R_2 are alkyl, cycloalkyl or aryl groups.

3,976,440
NON-LEADED GASOLINE HAVING IMPROVED ANTI-KNOCK QUALITY

Wallace R. Loder, Jr., North Olmsted; Philip S. Fay, Lyndhurst, and Franklin Veatch, University Heights, all of Ohio, assignors to Standard Oil Company, Cleveland, Ohio

Filed Sept. 24, 1975, Ser. No. 616,388
Int. Cl.² C10L 1/24
U.S. Cl. 44—68 **7 Claims**

1. A non-leaded gasoline composition for internal combustion engines containing from about 0.0625 to 1.00 grams of metal per gallon of fuel of a compound having the formula



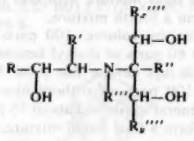
wherein M is a metal selected from the group consisting of manganese, iron, nickel, copper and zinc, X is the valence state of the metal and R is an alkyl, cycloalkyl or aryl group.

3,976,441
SUBSTITUTED AMINOALKYLPROPANEDIOL AND MOTOR FUEL COMPOSITION CONTAINING SAME

Jerzy J. Bialy, Lagrangeville, and David G. Weetman, Hopewell Junction, both of N.Y., assignors to Texaco Inc., New York, N.Y.

Filed Sept. 25, 1975, Ser. No. 616,700
Int. Cl.² C10L 1/22
U.S. Cl. 44—72 **10 Claims**

1. A motor fuel composition comprising a mixture of hydrocarbons in the gasoline boiling range containing from about 0.0001 to 0.01 weight percent of a substituted aminoalkylpropanediol represented by the formula:



in which R is a hydrocarbon radical having from 1 to 24 carbon atoms, R′, R″, R‴ and R⁗ represent hydrogen or a hydrocarbon radical having from 1 to 10 carbon atom and x and y are integers from 1 to 10.

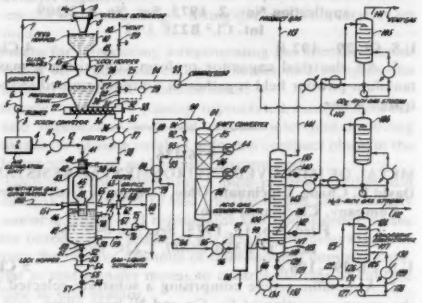
3,976,442
SYNTHESIS GAS FROM GASEOUS CO_2-SOLID CARBONACEOUS FUEL FEEDS

Peter L. Paull, Weston, Conn., and Warren G. Schlinger, Pasadena, Calif., assignors to Texaco Inc., New York, N.Y.

Filed Dec. 18, 1974, Ser. No. 533,908
The portion of the term of this patent subsequent to Aug. 24, 1993, has been disclaimed.
Int. Cl.² C10J 1/00
U.S. Cl. 48—197 R **12 Claims**

1. A continuous process for producing a gas stream principally comprising gases selected from the group consisting of CO, H_2, CO_2, H_2O, CH_4, H_2S, COS, N_2, A, and mixtures thereof comprising:

1. dispersing ground solid particles of carbonaceous fuel in a high pressure high velocity stream of CO_2-rich gas having a pressure in the range of about 50 to 5000 psig and a velocity in the range of about 5 to 500 ft. per sec.;
2. introducing the gas-solid fuel dispersion from (1) at a temperature in the range of about 80° to 1200°F, and simultaneously introducing a stream of free-oxygen containing gas selected from the group consisting of air, oxygen-enriched air (at least 22 mole % O_2), and substantially pure oxygen (at least 95 mole % O_2) at a temperature in the range of about 80 to 500°F into the reaction zone of a free-flow non-catalytic gas generator in the absence of supplemental H_2O other than that normally found in said gas-solid fuel dispersion and free-oxygen containing gas;
3. reacting said carbonaceous fuel and free-oxygen by partial oxidation and reacting CO_2 in said reaction zone at an autogenous temperature in the range of about 1200 to

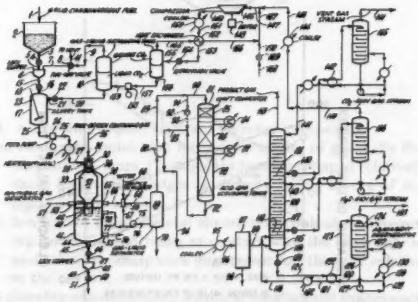


3000°F and a pressure in the range of about 30 to 4800 psig;
4. separating a CO_2-rich gas stream comprising in mole % CO_2 80 to 100 and H_2S 0 to 20 from the effluent gas stream from (3) in an acid-gas recovery zone; and
5. compressing said CO_2-rich gas stream and recycling said stream to (1) as said high pressure velocity stream of CO_2-rich gas.

3,976,443
SYNTHESIS GAS FROM SOLID CARBONACEOUS FUEL

Peter L. Paull, Weston, Conn., and Warren G. Schlinger, Pasadena, Calif., assignors to Texaco Inc., New York, N.Y.

Filed Dec. 18, 1974, Ser. No. 534,057
The portion of the term of this patent subsequent to Aug. 24, 1993, has been disclaimed.
Int. Cl.² C10J 1/00
U.S. Cl. 48—197 R **12 Claims**



1. A process for producing a gas stream principally comprising gases selected from the group consisting of CO, CO_2, H_2, H_2O, CH_4, H_2S, COS, N_2, A, and mixtures thereof comprising:

1. mixing liquid CO_2 and solid particles of carbonaceous fuel together in a mixing zone at a temperature in the range of above about −69° to 80°F, and a pressure in the range of about above the triple point pressure of carbon dioxide to about 1000 psia to produce a substantially water-free pumpable slurry;

2. introducing the mixture from (1) at a temperature in the range of about about −69° to 1200°F. and pressure in the range of above about 76 to 4500 psia, and simultaneously introducing a stream of free-oxygen containing gas selected from the group consisting of air, oxygen-enriched air (greater than 21 mole % O_2), and substantially pure oxygen (greater than 95 mole % O_2) at a temperature in the range of about 80 to 500°F. and a pressure in the range of above about 76 to 4500 psia, into the reaction zone of a free-flow noncatalytic gas generator; and
3. reacting said carbonaceous fuel and free-oxygen containing gas by partial oxidation in said reaction zone at an autogenous temperature in the range of about 1200° to 3000°F. and a pressure in the range of above about 30 to 4400 psia to produce said product gas stream.

3,976,444

PRODUCTION OF IMPROVED BORON ABRASIVES

Donald K. Kuehl, Manchester, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Oct. 25, 1974, Ser. No. 518,032
Int. Cl.² B24D *3/04, 3/06*
U.S. Cl. 51—307 **1 Claim**

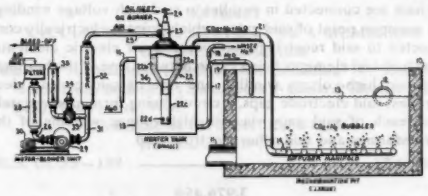
1. A method for the production of an abrasive material comprising the steps of:
heating elemental boron to a temperature above its melting point;
seeding the molten boron with 1–10% by weight seed crystals of an elemental metal selected from the group consisting of W, Mo and Ta to form crystalline borides thereof; and
cooling the mixture to cause formations of beta-rhombohedral boron with solidified borides distributed therein.

3,976,445

RECARBONATION PROCESS AND APPARATUS

Clarence J. Douglas, Tulsa, Okla., assignor to Ozark-Mahoning Company, Tulsa, Okla.

Filed May 23, 1974, Ser. No. 473,148
Int. Cl.² B01D *47/02*
U.S. Cl. 55—68 **6 Claims**



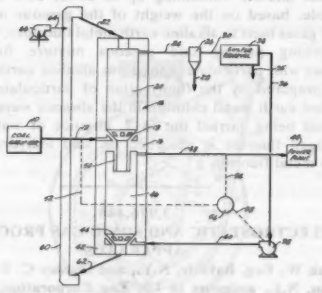
1. A process of recarbonating water using combustion products from which unburned hydrocarbon fuel has been removed, said process comprising the steps of:
a. providing a water reservoir having inlet means for admitting water to be treated and outlet means for discharging treated water therefrom,
b. providing a gas diffuser manifold submerged in said reservoir,
c. arranging a combustion burner fueled by hydrocarbon oil adjacent said reservoir, said burner being disposed within an enclosed vessel,
d. providing liquid in the lower portion of said vessel whereby combustion products at said burner are discharged into said liquid,
e. providing gas conduit means in fluid communication with the upper portion of said vessel and the gas diffuser manifold adjacent the bottom of said reservoir,
f. introducing water to be recarbonated into said reservoir,
g. operating said burner to discharge its combustion products including any unburned hydrocarbon fuels beneath the level of the liquid in which the burner is located, and
h. collecting the products of combustion in said vessel escaping from the surface of said liquid and passing same through said gas conduit means and said gas diffuser manifold to said reservoir,
i. whereby combustion gasses, from which said unburned hydrocarbon fuels have been separated, recarbonate the water in said reservoir.

3,976,446

SULFUR REMOVAL FROM HIGH TEMPERATURE FUEL GAS GENERATED BY GASIFICATION

Anker V. Sims, Redondo Beach, Calif., assignor to Thermo-Mist Company, Downey, Calif.

Filed Jan. 22, 1975, Ser. No. 543,147
Int. Cl.² B01D *53/06*
U.S. Cl. 55—73 **9 Claims**



1. A process for removing sulfur from hot fuel gas obtained from the gasification of coal with an unacceptably high sulfur content comprising the steps of:
a. continuously passing the hot fuel gas into a midsection of a heat transfer tower;
b. continuously passing the hot fuel gas from the midsection into the base of a fuel gas cooling section of the tower, the cooling section being above the midsection;
c. continuously passing cool solids into the top of the fuel gas cooling section;
d. continuously passing the solids and the fuel gas countercurrent to each other in the fuel gas cooling section and continuously transferring heat from the hot fuel gas to the cool solids in the fuel gas cooling section by direct countercurrent heat transfer to cool the fuel gas and heat the solids;
e. continuously removing the cooled fuel gas from the top of the fuel gas cooling section to separate the gas from the solids;
f. continuously removing sulfur from the removed and cooled fuel gas to form purified and cooled fuel gas;
g. continuously passing the purified and cooled fuel gas into the base of a solids cooling section of the tower, the solids cooling section being below the midsection;
h. continuously passing the heated solids from the base of the fuel gas cooling section into the top of the solids cooling section;
i. continuously passing the solids and the fuel gas countercurrent to each other in the solids cooling section and continuously transferring heat from the heated solids to the purified and cooled fuel gas in the solids cooling section by direct countercurrent heat transfer to cool the solids and heat the purified fuel gas;

j. continuously removing the heated and purified fuel gas from the solids cooling section at the top thereof to separate the heated and purified fuel gas from the solids for use of the heated and purified fuel gas as a fuel; and

k. continuously passing the cooled solids from the solids cooling section to the top of the fuel gas cooling section to recycle the solids.

3,976,447

REMOVAL OF HYDROGEN FLUORIDE FROM GASEOUS MIXTURE BY ABSORPTION ON ALKALINE EARTH METAL FLUORIDE

Dhirendra Ranchhoddas Merchant, Paducah, and Jimmie Ray Hodges, Benton, both of Ky., assignors to Pennwalt Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 354,715, April 26, 1973, which is a continuation-in-part of Ser. No. 153,839, June 16, 1971, abandoned. This application Mar. 11, 1975, Ser. No. 560,907

Int. Cl.² B01D *53/02*

U.S. Cl. 55—71 **16 Claims**

1. A method for the removal of hydrogenfluoride from a gaseous mixture containing up to about 20% of hydrogen fluoride, based on the weight of the gaseous mixture, and other gases inert to alkaline earth metal fluorides, said method comprising passing said gaseous mixture fluorocarbons contact with particulate, anhydrous alkaline earth metal fluoride prepared by the fluorination of particulate anhydrous alkaline earth metal chloride in the absence were water, said method being carried out in 2. absence of water whereby hydrogen fluoride is absorbed on said anhydrous alkaline earth metal fluoride.

3,976,448

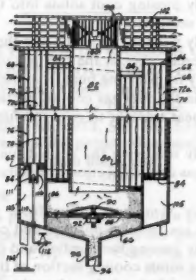
ELECTROSTATIC AND SONIC GAS PROCESSING APPARATUS

Joseph W. Eng, Bayside, N.Y., and Stanley C. F. Lin, Matawan, N.J., assignors to Lin Eng Corporation, New York, N.Y.

Continuation of Ser. No. 245,756, April 20, 1972, which is a continuation of Ser. No. 732,140, May 27, 1968, abandoned, and a continuation-in-part of Ser. No. 664,416, Aug. 30, 1967, Pat. No. 3,494,099. This application Mar. 24, 1975, Ser. No. 561,556

Int. Cl.² B01D *50/00*

U.S. Cl. 55—122 **10 Claims**



1. Gas processing or treating apparatus to effect chemical or physical changes in said gases or air, said unit comprising housing means, inlet means in said housing for admitting untreated gases or air thereinto for processing therein, adjacent and parallel electrodes positioned in said housing in the path of the incoming untreated gases or air, one of said electrodes being stationary and the other of said electrodes having flexible electrode means, said flexible electrodes means having a conductive upper longitudinal extending member, a conductive lower longitudinal extending member in substantially parallel relationship to said upper longitudinal member, and a plurality of spaced transversed flexible conductive ribbon members which are electrically vibratable for generating high intensity sonic forces and which have the upper portions thereof connected to said upper member and the lower portions thereof connected to said low longitudinal member, electrical circit means operatively connected to said electrodes which generate high intensity pulsating electrical and sonic forces between said stationary electrode and vibrating electrode means for treating the gases or air as the same flows through said housing means, and outlet means in said housing means through which the processed gases or air are carried from said housing means.

3,976,449

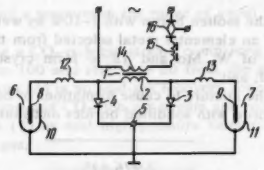
INSTALLATION FOR ELECTROSTATIC PRECIPITATION

Anatoly Lazarevich Efremidi, ulitsa Atoneli, 18, and Anton Lavrentievich Saralidze, ulitsa Sovetskaya, 87, both of Tbilisi, U.S.S.R.

Filed Oct. 7, 1975, Ser. No. 620,493

Int. Cl.² B03C *3/66*

U.S. Cl. 55—139 **2 Claims**



1. An installation for electrostatic precipitation, comprising: at least two receiving electrodes; at least two corona electrodes; at least two electrode gaps, each of said gaps being formed by one of said receiving electrodes and by one of said corona electrodes; a high-voltage rectifying unit; a high-voltage transformer of said rectifying unit; a high-voltage winding of said transformer; two opposing gates, the other outputs of which are connected in parallel to said high-voltage winding; a common point of said gates, which point is electrically connected to said receiving electrodes; linear electric elements, each of said elements being cut in between one of the bushings of said high-voltage winding and one of said corona electrodes; said electrode gaps, a circuit being formed alternately for each of said gaps via said high-voltage winding of the transformer and said other electrode gap.

3,976,450

GAS SAMPLE PREPARATION SYSTEM AND METHOD

Roland Marcote, 19519 Sherman Way, No. 7, Reseda, Calif. 91335; Steve Eisenberg, 5658 Fearing St., Santa Susana, Calif. 93063; Ramesh Chand, 2600 Wilshire Blvd., Suite 309, Los Angeles, Calif. 90057, and Herman Haase, 19047 E. Lynfield, Glendora, Calif. 91740

Continuation of Ser. No. 320,144, Jan. 2, 1973, abandoned. This application July 23, 1974, Ser. No. 491,026

Int. Cl.² B01D *53/22*

U.S. Cl. 55—158 **10 Claims**

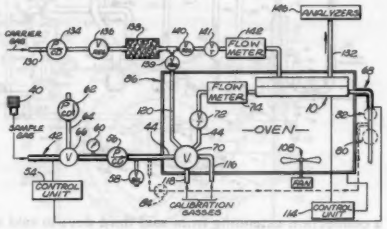
1. A system for preparing a gas sample for measurement of high concentrations of one or more selected gaseous components in a gas stream from a pollutant source, such as an industrial stack, containing particulate matter, water vapor and the like at higher than ambient temperatures, comprising:

a cell structure defining first and second gas retention chambers, each of said chambers having separate gas inlet and outlet ports;

a semipermeable membrane impervious to water vapor and particulate matter for separating said chambers and allowing diffusion of the selected gaseous components therethrough at a rate corresponding to the partial pressure of said component in said sample;

a porous probe means adapted to be disposed in said gas stream collecting a representative gas sample while excluding most particulate matter from the sample;

temperature controlled conduit means for maintaining the sample from said probe at temperatures above its maximum dew point and for introducing said sample to pass through said first chamber at a substantially constant predetermined temperature above said maximum dew point;



temperature control means, including an oven surrounding said cell structure, for maintaining said membrane and the cell structure defining said chambers at a substantially constant homogeneous temperature above said maximum dew point;

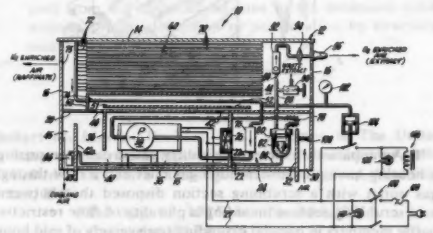
means for supplying a flow of carrier gas to said second chamber at a substantially constant rate to dilute the selected gaseous components diffusing through the membrane from the first into the second chamber; and,

means for conveying the mixture of said carrier gas and said diffused gaseous components from the second chamber to provide a clean, substantially dry gas mixture having a concentration of said selected components corresponding to the concentration in the gas sample from said source.

3,976,451
VACUUM EXTRACT SYSTEM FOR A MEMBRANE OXYGEN ENRICHER

Richard H. Blackmer, Scotia, and Jonathan W. Hedman, Burnt Hills, both of N.Y., assignors to General Electric Company, Milwaukee, Wis.

Filed June 4, 1974, Ser. No. 476,260
Int. Cl.² B01D *13/00*
U.S. Cl. 55—158 **17 Claims**



1. Apparatus for providing air enriched with oxygen comprising: an array of selectively permeable membrane cells, said cells being adapted to permit oxygen to permeate therethrough at a greater rate than nitrogen; means for developing a flow of atmospheric air; means for directing at least a portion of said flow across said array to develop permeation into said cells, said directing means including a chamber structure around said array to define a flow path for air about the membranes; means for maintaining a partial vacuum within said cells to draw off the oxygen enriched gas; conduit means operatively coupled with said cells and partial vacuum maintaining means for delivering said enriched gas for further use; and scrubber means in said conduit means for removing pollutants from said enriched gas.

3,976,452
DEVICE FOR THE SEPARATION OF GAS FROM A LIQUID

Hans Meier, Remscheid, and Andreas Wille, Wuppertal, both of Germany, assignors to Joh. Vaillant, K.G., Remscheid, Germany

Filed Aug. 12, 1974, Ser. No. 496,805
Claims priority, application Germany, Sept. 14, 1973, 2346286
Int. Cl.³ B01D *19/00*
U.S. Cl. 55—192 **9 Claims**

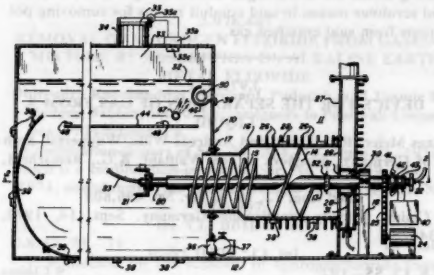
1. Apparatus for separating gas from a liquid pumped therethrough, said apparatus comprising a housing having inner wall means defining a separation chamber, a liquid supply pipe leading into said separation chamber in a given direction with an enlarging cross section extending in the direction of flow therethrough, a discharge pipe extending from an exit opening in said separation chamber in a direction substantially perpendicular to said supply pipe, flow deflection wall means arranged to define, together with the inner wall means of said housing, stabilizing chamber means within said separation chamber, said stabilizing chamber means being configured to effect therein vortical flow of fluid about a vortex axis, said flow deflection wall means extending between said stabilizing chamber means and said exit opening and being arranged to divide flow entering said separation chamber from said supply pipe into a pair of flow paths, one extending to said exit opening and the other extending into said stabilizing chamber with the major portion of said flow being directed toward said exit opening, exhauster means provided above said stabilizing chamber means defining an exhaust flow path therefrom extending in a direction generally coincident with the direction of said vortex axis, and orifice means extending through said flow deflection wall means in flow communication between said exit opening and said stabilizing chamber means, said orifice means being arranged to extend in a direction generally eccentrically to the path of said vortex flow about said vortex axis in said stabilizing chamber means and located longitudinally relative to said vortex axis to impart to said vortex flow a longitudinal component progressing toward said exhauster means.

3,976,453

LIQUID VORTEX VACUUM PUMP

Kenard D. Brown, 1227 S. Willow St., Casper, Wyo. 82601

Filed Aug. 12, 1974, Ser. No. 496,817
Int. Cl.² B01D 47/18
U.S. Cl. 55—222 7 Claims



1. A scrubber for cleaning combustion gases and the like comprising:

a. a tank filled with a body of liquid to a predetermined level therein and having an opening in a lower side wall portion thereof below said predetermined level of liquid;

b. a gas and liquid pump of the liquid vortex type mounted on said tank and arranged for discharging vortically mixed gas and liquid through said opening in said lower side wall portion and into said tank below said predetemined level of liquid therein;

c. said pump comprising a cylindrical shroud arranged outside said tank in open communication with said tank through said opening and having means for detachably securing said shroud to said side wall portion of said tank about said opening and sealing said opening to the wall of said tank, said shroud providing an outside surface for removing heat from said pump, a helical rotor mounted for rotation in said shroud, fluid inlet means for admitting fluids including the combustion gas to said shroud for mixture with the combustion gas remote from said detachable securing means and means for rotating said helical rotor;

d. means outside said tank and including said detachable means for supporting said pump;

e. means for removing cleansed gases from said tank; and

f. means for returning liquid from said tank to the interior of said shroud.

3,976,454

EXHAUST SYSTEM FOR STEEL-MAKING PLANT

Gerhard Hausberg, and Karl-Rudolf Hegemann, both of Essen, Germany, assignors to Gottfried Bischoff Bau kompl. Gasreinigungsund Wasserruckkuhlanlagen Kommandigesellschaft, Essen, Germany

Filed Feb. 19, 1975, Ser. No. 551,052
Claims priority, application Germany, Feb. 20, 1974, 2407998
Int. Cl.² B01D 47/06
U.S. Cl. 55—226 6 Claims

1. An exhaust system for a steel-making plant including a converter and ancillary equipment giving rise to dust-laden waste gases, comprising:

a main scrubbing station provided with a first duct originating at said converter and with first exhaust means for aspirating waste gases from said converter during operation thereof through said first duct;

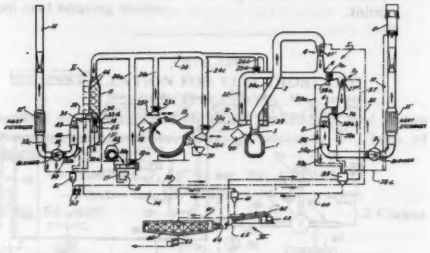
first irrigation means including an upstream washing stage and a downstream washing stage in said first duct for purifying the waste gases aspirated from said converter;

flow-control means in said first duct operable to obstruct same at a location upstream of said downstream washing stage;

a secondary scrubbing station provided with a second duct originating at said ancillary equipment and with second exhaust means for aspirating waste gases from said ancillary equipment through said second duct;

second irrigation means in said second duct for purifying the last-mentioned waste gases;

a third duct with an inlet positioned in the vicinity of the converter outlet for intercepting gases evolving during charging of the converter, said third duct opening into said first duct at a junction between said upstream washing stage and said downstream washing stage;



a connection extending from said third duct to said second duct including valve means for enabling intercepted gases from said converter to be drawn by said second exhaust means via said third and second ducts through said second irrigation means; and

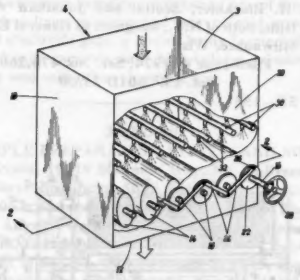
actuating means for selectively displacing said flow-control means between an unblocking position and a throttling position whereby said intercepting gases can be drawn by said first exhaust means via said third and first ducts through said downstream washing stage in a charging phase of the converter.

3,976,455

APPARATUS FOR CLEANING A DIRTY GAS STREAM

Francis E. Dahlem, Louisville, Ky., assignor to American Air Filter Company, Inc., Louisville, Ky.

Filed May 6, 1975, Ser. No. 575,007
Int. Cl.² B01D 47/10
U.S. Cl. 55—226 3 Claims



1. An apparatus for cleaning a dirty gas stream comprising: a housing having a flow through gas inlet and a flow through gas outlet with a scrubbing section disposed therebetween, said scrubbing section including a plurality of flow restrictive baffle members in parallel extending transversely of said housing, said baffle members having cross-sectional dimensional areas wherein one dimension is greater than the other dimension with pivot points eccentrically disposed a preselected distance from a longitudinal axis of said baffle members, adjacent baffle members having opposed pivot points, said baffle members including means to rotate adjacent baffle

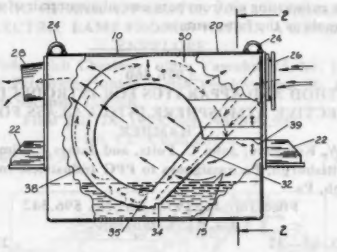
members in opposite directions, said means to rotate being connected to said pivot points whereby movement of said baffle members defines alternating converging and diverging sections between each pair of baffle members; and, means for spraying a scrubbing solution into said gas stream between said gas inlet and said scrubbing section.

3,976,456

GAS SCRUBBER

Keith Alcock, Columbus, Ohio, assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Apr. 7, 1975, Ser. No. 565,927
Int. Cl.² B01D *47/10*
U.S. Cl. 55—238 **11 Claims**



1. A gas scrubber for cleaning and cooling exhaust gases from an engine, comprising:

an enclosure partially filled with a liquid and having an inlet above the liquid adapted to receive the hot exhaust gases from the engine, and an outlet also above the liquid; and

a tube situated in the enclosure and connected at one end to the inlet and having its other end opening into the interior of the enclosure above the pool of liquid, comprising: an inlet section extending from the inlet downward to a transition section; said transition section being at least partially submerged in the liquid and having an orifice through the tube wall in the submerged portion through which droplets of the liquid are induced into the flow of exhaust gases through the tube; and an expansion section extending from the submerged transition section upwardly and terminating at the open end of the tube, the expansion section being of constantly expanding cross-sectional area in the direction toward the open end and at least a portion of the expansion section is arcuate such that the wetted gases are decelerated sufficiently and the liquid droplets and particulate matter separate from the gases, the open end of the tube beng disposed in the interior of the enclosure such that the liquid droplets and the particulate matter fall directly into the body of liquid while the cleaned and cooled gases can flow freely in a path from the outlet of the tube to the enclosure outlet without further deflection or acceleration by structural means in said flow path.

3,976,457

IN-STACK FILTER CELL

Robert M. Martin, Durham, N.C., assignor to The United States of America as represented by the Administrator of the United States Environmental Protection Agency, Washington, D.C.

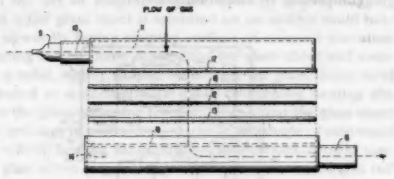
Filed Aug. 13, 1975, Ser. No. 604,397
Int. Cl.² B01D *53/30*
U.S. Cl. 55—270 **4 Claims**

1. A filter cell sampling device for collecting particulate matter directly within a stack or duct during an isokinetic flow of gas containing the particulate matter through the stack or duct, comprising:

a generally tubular closed housing of two generally hemicylindrical separable halves for direct insertion into the stack or duct and having an elongated inlet chamber and an elongated outlet chamber, the inlet and outlet chambers both extending substantially the axial length of the cylindrical housing;

inlet means for drawing the flow of gas into said housing, said inlet means including an inlet nozzle at the upstream end of and communicating with the inlet chamber of said housing in one end thereof;

a preweighed filter means in sheet form in said housing extending substantially the length thereof and disposed downstream of the inlet chamber parallel to and lying between the elongated inlet and outlet chambers and



parallel to the flow of gas entering said housing from said inlet at the end of the inlet chamber, said filter being disposed upstream from the outlet chamber and being formed of a heat and moisture resistant material, and means in said housing to support and to hold said filter in sheet form;

sealing means between the halves of said housing for ensuring a leakless seal; and

outlet means for directing the flow of gas out of said housing, said outlet means being disposed downstream of the outlet chamber in the end of the housing generally opposite the location of said inlet means to direct the flow of gas through the outlet chamber generally parallel to said filter means.

3,976,458

REFRIGERATION MEANS

Laurence M. Krug, Tuscon, Ariz., assignor to George C. Jeffreys, Goldsboro, N.C.

Continuation-in-part of Ser. No. 396,387, Sept. 12, 1973, Pat. No. 3,866,433. This application Feb. 18, 1975, Ser. No. 550,866
Int. Cl.² B60H *3/04*
U.S. Cl. 62—175 **16 Claims**

1. In an engine powered vehicle having a storage battery and a geneerator connected to said engine and battery and a refrigerated compartment and a refrigeration system therefor including a cooling coil, a compressor connected by a conduit to the outlet of said cooling coil, an alternating current motor operatively connected to said compressor, a condensor connected by conduit to the outlet of said compressor and to the inlet of said cooling coil, and an expansion valve to adiabatically expand a refrigerant in the conduit to said cooling coil, the improvement comprising:

a. a second compressor mounted on said vehicle, said second compressor connected by conduit to said condensor and to said cooling coil in parallel with said first named compressor,

b. means operatively connecting said second compressor to said vehicle engine to be driven by said engine when said engine is in operation, said second compressor having a clutch means to operably connect and disconnect said second compressor and said engine,

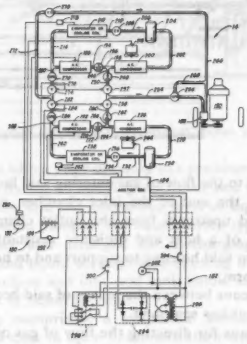
c. control means operatively connected to said system to intermittently operate said second compressor relative to the refrigeration demand of said system when said engine is operating and to intermittently operate said first named

compressor relative to the refrigeration demand of the system when said alternating current is connected to a source of alternating current electric power,

d. said control means having a thermostat switch means communicably connected to said cooling unit, said thermostat switch being electrically connected to said alternating current electric motor to intermittenly operate same, and being electrically connected to said clutch means to intermittently engage same,

e. a first check valve means communicably connected to said conduit from said outlet to said first named compressor to compress fluids from said first named compressor to said condensor,

f. a second check valve means connected to the outlet of said second compressor to pass fluid from said second compressor to said condensor,



g. a first solenoid actuated valve means communicably connected in said conduit between said cooling coil and said second compressor and electrically connected to said control means,

h. a second solenoid actuated valve means communicably connected in said conduit between said second compressor and said condensor and electrically connected to said control means, said control means being operable to close said firt solenoid actuated valve and said second solenoid actuated valve when said alternating current motor is connected to a source of electricity, and

i. said second compressor is constructed and adapted to be operable during periods when said alternating current motor is disconnected from a source of alternating current electricity and said vehicle engine operating.

3,976,459

CHILL COOLER

Willard H. Ames, 10905 N. Oriole Lane 20 W., Mequon, Wis. 53092

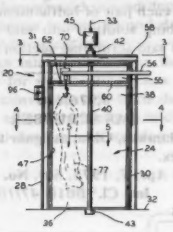
Filed Feb. 6, 1975, Ser. No. 547,437
Int. Cl.² F25D *23/02*
U.S. Cl. 62—266 **18 Claims**

1. A cooler for use in a packing plant, said cooler including and enclosure in which a product is cooled, an air lock system for minimizing the exchange of air between said cooler and the other portions of said plant,

said air lock system including:

cylindrical housing means having an entrance opening and and exit opening spaced from said entrance opening,

a plurality of spaced apart door panel means mounted for rotation about the axis of said cylindrical housing means and each of said door panel means having an outer edge in proximity to the inner surface of said cylindrical housing, and vertical wall means extending tangentially from said cylindrical housing means and adjacent said exit opening, said vertical wall means extending generally in the direction of rotation of said door panel means, and exhaust fan means mounted in said vertical wall means



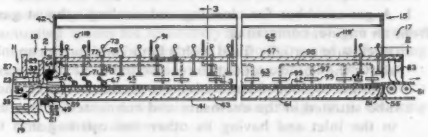
for exhausting air from between adjacent pair of said door panels as the latter rotate.

3,976,460

METHOD AND APPARATUS FOR INTRODUCING A PROTECTIVE ATMOSPHERE INTO A GLASS FORMING CHAMBER

John W. Kompare; John C. Potts, and James L. Simpson, all of Pittsburgh, Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed July 16, 1975, Ser. No. 596,342
Int. Cl.² C03B *18/02*
U.S. Cl. 65—32 **23 Claims**



1. In the method of making flat glass wherein molten glass is delivered onto the surface of a pool of molten metal in an enclosed chamber that includes a ceiling separating the chamber into two enclosed spaces, a headspace below the ceiling and a service space above the ceiling, and is advanced as a layer along the surface of the pool of molten metal while being cooled and formed into a dimensionally stable, continuous sheet of glass which is withdrawn from the pool of molten metal and from the enclosed chamber and wherein a protective atmosphere gas is introduced into the chamber in the headspace extending over the advancing glass and the pool of molten metal and wherein heat is supplied in said headspace from heaters while the service space above them inherently receives heat, the improvement comprising

directing a portion of the introduced protective gas through a heat exchanger located inside the service space of the chamber and closely spaced in effective heat exchange relation to a first portion of the service space of the chamber which is substantially hotter than a second portion of the service space of the chamber and then

distributing a substantial amount of the introduced protective gas that has been directed through the heat exchanger in the first portion of the service space of the chamber into the headspace of the chamber at a location beneath the second portion of the service space of the chamber whereby a hotter portion of the service space is cooled while heat removed therefrom is directed into a location of the headspace of the chamber beneath a colder portion of the service space.

10. In an apparatus for making flat glass comprising an enclosed chamber having an outer casing, a liner within the bottom portion of the casing containing a pool of molten metal, a ceiling disposed within the chamber and separating it into two spaces, a headspace beneath the ceiling and above the pool of molten metal and a service space above the ceiling and inside the

outer casing, wherein heaters are mounted within the headspace of the chamber in spaced facing relation to the pool of molten metal, which heaters are connected to power connectors mounted within the service space of the chamber, the improvement comprising

a heat exchanger having an inlet and an outlet positioned within the service space of the chamber in closely spaced relation to a power connector

an inlet conduit for supplying a protective gas to the chamber connected to the inlet of the heat exchanger

an outlet conduit for carrying the protective gas from the heat exchanger to the headspace of the chamber connected to the outlet of the heat exchanger

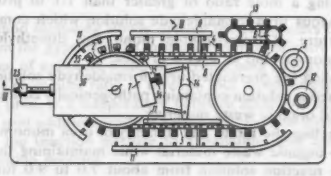
gas distribution means for distributing the protective gas into the headspace of the chamber connected to the outlet conduit and mounted inside the headspace of the chamber.

3,976,461

METHOD OF AND APPARATUS FOR ASSEMBLING ELECTRIC LAMP PRONGS WITHIN A GLASS ENVELOPE

Valery Fedorovich Chestnov, ulitsa Vasenko, 15, kv. 18, and Dmitry Petrovich Ivankin, ulitsa Veselovskogo, 30, kv. 32, both of, Saransk, U.S.S.R.

Filed July 28, 1975, Ser. No. 599,945
Int. Cl.² C03B *23/14*
U.S. Cl. 65—59 A **7 Claims**



1. A method of assembling electric lamp prongs consisting in that the prong flanges and exhaust tubes are put in succession into the clamps of a chain conveyor running around a driving sprocket and a driven sprocket; said flanges and exhaust tubes carried by the conveyor are heated; the heated flanges and exhaust tubes are fitted with electrodes after which the prong flanges and exhaust tubes with electrodes are stamped with simultaneous blowing through of holes in the exhaust tubes; then the prong parts are annealed; insertion of electrodes into the flanges and exhaust tubes, stamping of parts and blowing of holes are performed on one of said sprockets.

3. An installation for assembling electric lamp prongs comprising: a chain conveyor; driving and driven sprockets around which said chain conveyor runs; a drive connected with said driving sprocket for setting the conveyor in continuous motion; clamps secured to the chain conveyor and intended to receive, hold and convey the prong parts, i.e., flanges, exhaust tubes and electrodes; a device for loading the flanges into said conveyor clamps installed near said conveyor and provided with actuating mechanisms; a device for loading the exhaust tubes into the flanges located in the clamps of said conveyor, said device being installed along the conveyor in the order of prong assembly and provided with actuating mechanisms; burners for heating the flanges and exhaust tubes moved by said conveyor clamps; a device for loading electrodes into the heated flanges and exhaust tubes, provided with actuating mechanisms; mechanisms for stamping the prong parts; mechanisms for blowing through holes in the exhaust tubes; burners for annealing the prongs installed along said conveyor; a device for unloading the assembled prongs, installed near said conveyor; said burners for heating the flanges and exhaust tubes are installed along said conveyor before said device for loading electrodes to the zone of said burners for annealing the prongs; the actuating mechanisms of said electrode-loading device, the prong-stamping and exhaust tube hole-blowing mechanisms are located on one of said sprockets in the order of prong assembly.

3,976,462

METHOD AND APPARATUS FOR BENDING GLASS SHEETS

Steve J. Sutara, Natrona Heights, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Mar. 10, 1975, Ser. No. 556,745
Int. Cl.² C03B *23/02*
U.S. Cl. 65—107 **6 Claims**

1. In the art of shaping a glass sheet by gravity sagging wherein a flat glass sheet is mounted on an outline mold having an upwardly facing shaping surface of concave elevation conforming to the shape desired for the glass sheet and comprising a solid, rigidly shaped metal rail, the glass laden mold is subjected to a temperature cycle comprising heating the latter to the glass-softening temperature so that the glass sheet softens and sags to conform its shape to the shape of said mold during which heating longitudinal end portions of said supported glass sheet remain in contact with a portion of said rail for a greater portion of said heating step than other portions of said glass sheet, said metal rail having a heat capacity per unit area sufficiently greater than that of the glass sheet so that said longitudinal end portions of the glass sheet that are in direct contact with said rail portion for a greater proportion of said heating step than other portions of said glass sheet have their normal heating rate retarded sufficiently for said glass sheet portions in contact with said rail section to develop a temperature gradient relative to a glass sheet portion out of contact with said mold to tend to break said glass sheet during said temperature cycle,

the improvement comprising loosely disposing a thin sheet metal member in folded relation on said rail portion only in positions to interpose said glass sheet longitudinal end portions from direct contact with said rail when said glass sheet is loaded on said mold for bending and when said glass laden mold is heated rapidly to the glass deformatiion temperature.

3. Apparatus for shaping a glass sheet by gravity sagging when the glass is heat-softened, comprising: an outline mold including a heavy metal mold rail having an upper surface of concave elevation conforming to the desired curved shape for the glass sheet and oriented to support the glass sheet thereon, wherein portions of said rail surface contact the glass sheet for a greater amount of time during the shaping process than the remainder of said rail surface, thin sheet metal members loosely folded over only said glass-contacting rail surface portions so as to reduce transfer of heat between said glass sheet and the metal mold rail at said surface portions, the remainder of said upper rail surface being uncovered.

3,976,463

APPARATUS FOR FUSION BONDING TUBULAR RECUPERATOR STRUCTURES

Yu K. Pei, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 531,235, Dec. 10, 1975, Pat. No. 3,936,288, and Ser. No. 333,402, Feb. 16, 1973, Pat. No. 3,926,251. This application Sept. 23, 1975, Ser. No. 616,106
Int. Cl.² C03B *9/42*
U.S. Cl. 65—152 **5 Claims**

1. Apparatus for uniting oblique bent tubular components for making heat exchange assemblies comprising

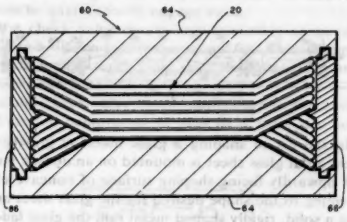
a constraining mold having a bottom wall and integral opposed side walls,

a pair of end wall members,

means integral with the respective side walls for receiving the end wall members near the opposite ends thereof and

detachably connecting said end wall members in opposing relationship for selectively closing and opening the ends of the mold,

said bottom and opposed side walls and end wall members connected thereon defining a cavity open at the top for receiving an assembly of end bent tubular elements arranged in plural layers,



said cavity having an intermediate longitudinally extending section disposed parallel to said side walls and opposite oblique end sections for receiving said end bent tubular assemblies, each said end section being contiguous with said intermediate section and disposed angularly with respect thereto,

a top cover member adapted to close the top of said cavity and thereby enclose the assembly of said tubular elements therein, said top cover member engaging and securing the end wall members along the adjacent edge thereof.

3,976,464

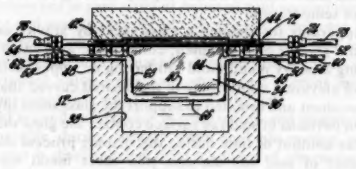
SKIMMER

William G. Wardlaw, Anderson, S.C., assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Continuation of Ser. No. 494,664, Aug. 5, 1974, abandoned. This application July 23, 1975, Ser. No. 598,308

Int. Cl.² C03B 5/20

U.S. Cl. 65—337 **3 Claims**



1. A glass-melting furnace comprising a main melting tank, a throat communicating with said main melting tank for receiving molten glass therefrom, said throat having side walls spaced apart a given distance and a top wall, channel means communicating with said throat for supplying molten glass therefrom toward a plurality of product-forming means, a skimmer in said throat, said skimmer comprising a refractory member having a generally rectangular shape and having a width slightly less than the width of said throat, means affixed to said refractory member and extending generally horizontally beyond side edge portions of said refractory member and supported in a fixed position by the side walls of the throat above the surface of the molten glass therein for supporting said member in the throat with a lower edge portion of said member extending substantially below the surface of the molten glass in said throat, and means for cooling at least a portion of the periphery of said member including said lower edge portion and side edge portions thereof, said cooling means comprising means forming a passage extending along the lower edge of said refractory member and along at least parts of the side edge portions of said member and having end portions extending outside said throat above the surface of the molten glass therein for communication with coolant inlet and outlet means, said cooling means along the side edge portions of said member being parallel to the side walls of said throat and being positioned sufficiently close to the side walls of said throat to solidify the molten glass tending to pass between the side walls and the side edge portions of said refractory member, and refractory material in said side walls sealing off those portions of said supporting means and said cooling means which extend through said side walls.

3,976,465

STERILIZED ORGANIC WASTE PRODUCT AND PROCESS OF PRODUCING SAME

James M. O'Donnell, Woonsocket, R.I., assignor to Orgonics, Inc., Slatersville, R.I.

Continuation-in-part of Ser. No. 196,765, Nov. 8, 1971, abandoned. This application Apr. 17, 1975, Ser. No. 568,867

The portion of the term of this patent subsequent to Mar. 9, 1993, has been disclaimed.

Int. Cl.² C05F 3/00

U.S. Cl. 71—13 **17 Claims**

2. A process for preparing a pathogenically stable solid organic waste material useful as a fertilizer or an animal feed product, which process comprises:

a. prereacting an aqueous solution of urea and formaldehyde under alkaline conditions, the urea-formaldehyde having a mole ratio of greater than 1:1 to provide an aqueous urea-formaldehyde solution which comprises a mixture of water-soluble mono and dimethylol urea monomers and an excess of urea;

b. adding the prereacted urea-formaldehyde solution to an aqueous solution containing pathogenically contaminated solid organic waste material;

c. reacting the mono and dimethylol urea monomers with the organic waste material while maintaining the pH of the reaction solution from about 7.0 to 9.0 for a time sufficient to sterilize the pathogenic organisms in the organic waste material;

d. condensing the mono and dimethylol ureas in the alkaline reaction solution by adding an acid or acid salt to establish an acid pH condition of from about 2.0 to 5.0 in the reaction solution to form a solid hydrophobic sterile water-insoluble reaction product which comprises a reaction admixture of an essentially linear solid polyurea condensate having methylene bridges, and a molecular weight of less than 800 and solid sterilized organic waste material; and

e. recovering the solid reaction product from the solution.

3,976,466

FERTILIZER MADE FROM NITROCELLULOSE AND PROCESS OF MAKING SAME

Libera M. Dogliotti, Sherborn, Mass.; Ronald C. Chalk, London, Canada; Leo A. Spano, Cumberland, R.I., and Dale H. Sieling, Natick, Mass., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 17, 1974, Ser. No. 533,577

Int. Cl.² C05F 7/02

U.S. Cl. 71—25 **5 Claims**

1. A process of converting waste nitrocellulose into a fertilizer which comprises the steps of:

a. forming a mixture of finely divided particles of nitrocellulose with a solution of ammonium hydroxide, the ammonium hydroxide in said solution being in a molar ratio to said nitrocellulose of from about 4:1 to about 26:1 and being in a concentration of from about 5 percent to about 30 percent of said solution, and

b. reacting said mixture at a temperature of from about 70 to about 75 degrees Centigrade and for a length of time sufficient for said ammonium hydroxide to remove substantially all of the nitrate groups from said nitrocellulose by denitration of said nitrocellulose and to produce am-

monium nitrate in said solution of ammonium hydroxide, whereby a liquid fertilizer in the form of a slurry is produced comprising said ammonium nitrate and degradation products formed by degradation of the cellulose backbone of said nitrocellulose.

3,976,467

UREA GYPSUM ADDITION PRODUCT AND METHOD

Rupen B. Seferian, 1372 N. Grand Oaks, Pasadena, Calif. 91109, and Roy M. Kaprielian, 1140 Oakwood Drive, San Marino, Calif. 91108

Filed Aug. 25, 1975, Ser. No. 607,150
Int. Cl.² C05C 9/00; C04B 11/00; C07C 126/00, 127/00
U.S. Cl. 71—28 10 Claims

1. Method for conversion of dihydrate gypsum soil supplement into a plant nutrient containing slowly soil-releasable urea by controllably displacing the two waters of hydration of the gypsum with only two moles of urea to form an addition product having the empirical formula

$$(CaSO_4)_2.2CO(NH_2)_2$$

the method including slowly driving the two waters of hydration from the gypsum in an intimate reaction mixture substantially free of unbound water and comprising said gypsum and urea in a molecular ratio of three to four moles of gypsum per mole of urea, at a temperature between about 95° and 140°C to form said addition product within the reaction mixture, and cooling the reaction mixture to a frangible solid comprising said addition product.

3,976,468

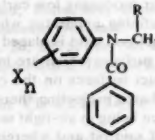
HERBICIDE MIXTURE OF LOWER ALKYL ESTERS OF N-BENZOYL-N-CHLOROPHENYL-2-AMINO-LOWER ALKANOIC ACIDS AND 3-LOWER ALKYL-2,1,3-BENZOTHIADIAZINONE-(4)-2,2-DIOXIDES OR SALTS THEREOF

Adolf Fischer, Mutterstadt, Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed July 10, 1974, Ser. No. 487,374
Claims priority, application Germany, July 18, 1973, 2336444
Int. Cl.² A01N 9/12
U.S. Cl. 71—91 3 Claims

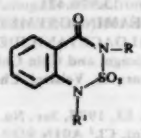
1. A herbicide composition comprising an inert carrier having dispersed therein a herbicidally effective amount of a mixture of

a. a compound of the formula



wherein X denotes chloro, R denotes hydrogen or lower alkyl, R^1 denotes lower alkyl and n denotes 0, 1, 2 or 3, and

b. a compound of the formula



wherein R denotes lower alkyl and R^1 denotes hydrogen, or the ammonium, potassium, sodium, lithium, calcium, magnesium, ethylamine, dimethylamine, diethylamine, diethanolamine, ethanolamine, dimethylethanolamine, or trimethylamine salt of said compound in a weight ratio of *a* to *b* in the range of 2:1 to 1:2.

3,976,469

HALOGENATED KETONES AS HERBICIDE ANTIDOTES

Duane R. Arneklev, Antelope, Mont.; Ferenc M. Pallos, Walnut Creek, and Edmund Gaughan, Berkeley, both of Calif., assignors to Stauffer Chemical Company, Westport, Conn.

Continuation of Ser. No. 307,301, Nov. 16, 1972, abandoned. This application Nov. 25, 1974, Ser. No. 527,662
Int. Cl.² A01N 9/12
U.S. Cl. 71—100 40 Claims

1. The method of reducing injury to corn plants injured by thiocarbamate herbicides comprising applying to the corn seeds prior to planting a non-phytotoxic antidotally effective amount of a compound corresponding to the formula

wherein R_1 is halocycloalkyl in which halo is fluoro, chloro or bromo and containing from 3 to 6 carbon atoms, inclusive, lower alkyl containing from 1 to 4 carbon atoms, inclusive, lower haloalkyl in which halo is fluoro, chloro or bromo and containing from 1 to 4 carbon atoms, inclusive, phenyl, benzyl, and p-tolyl; R_2 is lower haloalkyl in which halo is fluoro, chloro or bromo and containing from 1 to 4 carbon atoms, inclusive, α-halobenzyl in which halo is fluoro, chloro or bromo, haloacetonyl in which halo is fluoro, chloro or bromo, and haloalkylenecarboalkoxy in which halo is fluoro, chloro or bromo and having a total of 3 to 8 carbon atoms, inclusive, provided that when R_2 is difluoromonochloromethyl, R_1 is other than monofluorodichloromethyl.

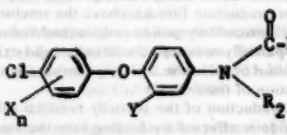
3,976,470

DIPHENYL ETHER AMIDES

Don R. Baker, Orinda, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Filed July 23, 1975, Ser. No. 598,486
Int. Cl.² C07C 155/02
U.S. Cl. 71—100 49 Claims

1. A compound having the formula



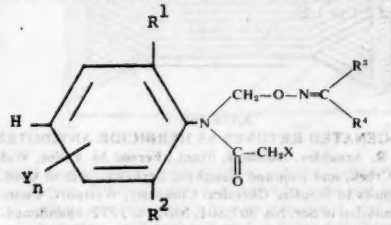
in which X is chloro or methyl; *n* is 0, 1 or 2; Y is chloro or trifluoromethyl; R_1 is thio-lower alkyl; and R_2 is hydrogen, lower alkoxyalkyl or lower alkanoyl.

3,976,471
N-(ALKYLIDENEAMINOOXYMETHYL)-ALPHA-HALOACETANILIDES

Sidney B. Richter, Chicago, and Chin Ching Wu, Libertyville, both of Ill., assignors to Velsicol Chemical Corporation, Chicago, Ill.

Filed Aug. 13, 1975, Ser. No. 604,399
Int. Cl.² A01N 9/20
U.S. Cl. 71—105 **10 Claims**

1. A compound of the formula



wherein R^1 and R^2 are each alkyl; Y is selected from the group consisting of hydrogen, alkyl, alkoxy, halogen, cyano, alkylthio, haloalkyl, alkoxyalkyl and alkylthioalkyl; *n* is an integer from 0 to 2; R^3 and R^4 are each selected from the group consisting of hydrogen and alkyl, or R^3 and R^4 together can form a cycloalkyl group of from 3 to 7 carbon atoms; and X is chlorine or bromine.

9. A herbicidal composition comprising an inert carrier and, as an essential active ingredient, in a quantity toxic to weeds, a compound of claim **1**.

10. A method of controlling weeds which comprises contacting said weeds with a herbicidal composition comprising an inert carrier and, as an essential active ingredient, in a quantity toxic to weeds, a compound of claim **1**.

3,976,472
METHOD AND AN ELECTRICALLY HEATED DEVICE FOR PRODUCING MOLTEN METAL FROM POWDERS OR LUMPS OF METAL OXIDES

Rolf Linder, Skjutarevagen 7, 77 200 Grangesberg, Sweden

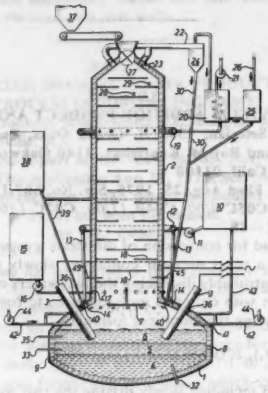
Filed May 15, 1974, Ser. No. 469,983
Claims priority, application Sweden, May 17, 1973, 73070229
Int. Cl.² C21C 5/52; C21B 5/06
U.S. Cl. 75—10 R **39 Claims**

1. An improved method of producing molten metal from a metal oxide in powder or lump form, by passing said metal oxide downwardly towards an electrically heated smelting furnace and subjecting the downwardly moving oxide to the action of reducing gases before entry into the smelting furnace, in which the improvement comprises dividing the reduction of the metal oxide to molten metal into a pre-reduction step wherein the downwardly moving oxide is partially reduced in a pre-reduction furnace above the smelting furnace but remains substantially solid, and an end-reduction step wherein the partially reduced substantially solid oxide is converted to molten metal in the smelting furnace, by the following combination of features:

a. the end reduction of the partially reduced substantially solid oxide is effected by feeding into the smelting furnace a reducing agent selected from the group comprising solid, liquid and gaseous carbonaceous and hydrocarbon-containing carbonaceous materials, to produce substantially complete reduction of the oxide to molten metal with evolution of hot reducing gases, containing a substantial amount of hydrocarbons;

b. introducing the hot reducing gases from said smelting furnace upwardly to the discharge end of the downwardly moving oxide; and

c. cooling said hot reducing gases substantially before or at the region of introduction thereof by mixing therewith a

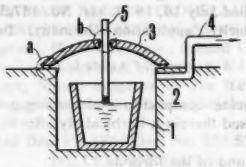


cooling agent, selected from solid, liquid and gaseous cooling agents, adapted both to produce a lower temperature of the hot reducing gases sufficient to prevent agglomeration of the pre-reduced substantially solid oxide before it enters the smelting furnace, and also to provide an increase in the molar amount of reducing gases available for the prereduction step by endothermic reforming reaction with hydrocarbons to CO and H_2.

3,976,473
METHOD FOR PRODUCING AN EXTREMELY LOW CARBON AND NITROGEN STEEL IN A VACUUM REFINING APPARATUS

Hiroyuki Katayama, and Makoto Inatomi, both of Kitakyushu, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Dec. 27, 1974, Ser. No. 536,983
Claims priority, application Japan, Dec. 31, 1973, 49-3860
Int. Cl.² C21C 7/10, 5/32, 5/42
U.S. Cl. 75—49 **3 Claims**



1. In a method for producing low carbon and nitrogen steel using a vacuum refining apparatus wherein molten steel is placed in a container and a lid is placed on the container, the lid having contact surfaces which are in air-tight sealed relationship with contact surfaces on the container, the lid also having an oxygen lance projecting therethrough, the contact surfaces of the lance being in air-tight sealed relationship with contact surfaces of said lid and wherein the pressure within the thus sealed container is reduced and oxygen is blown into the steel from the lance to refine the steel, the improvement wherein the respective sealed relationships between the contact surfaces of the container and the lid and the lance and the lid are each provided by double seals, said double seals

defining a chamber between each seal making up said individual double seals, said chambers having an entrance port, and wherein during the refining operation, an inert gas is introduced to said chambers, the pressure of the inert gas in the chambers being greater than that in the sealed container whereby leakage of air into the chamber is minimized and a portion of the inert gas leaks into the container thereby decreasing the partial pressure of nitrogen gas within said container.

2. The method of claim 1 wherein the container is in a pit and the lid is in air tight sealed relationship with the sides of the pit.

3,976,474

COVERING LAYER FOR METALLIC BATHS

Wolf Wunder, Weisskirchen; Volker Köhne, Montabaur; Rosolde Hill, Nieder-Roden, and Antonio Leogrande, Werdohl, all of Germany, assignors to Vereinigte Deutsche Metallwerke AG, Frankfurt am Main, Germany

Continuation of Ser. No. 399,510, Sept. 21, 1973, abandoned. This application May 19, 1975, Ser. No. 578,945

Claims priority, application Germany, Sept. 22, 1972, 2246723; May 8, 1973, 2323073

Int. Cl.² C22B 9/00, 9/10; C03C 3/08

U.S. Cl. 75—96 **5 Claims**

1. A method of reducing metal loss from a molten brass bath to which scrap brass, e.g. chips and wire scraps, having a large surface area/volume ratio is added, comprising the steps of melting away from said bath components for a covering material consisting of:

10 to 70% by weight B_2O_3

5 to 65% by weight SiO_2 and

5 to 40% by weight of an alkali metal oxide selected from the group which consists of Na_2O, K_2O and Li_2O to form a homogeneous molten alkali borosilicate glass;

solidifying said glass;

comminuting the solidified alkali borosilicate glass to a particle size less than 60 microns; and

depositing the comminuted homogeneous alkali borosilicate glass upon said molten brass bath by mixing it with the scrap introduced into said melt in an amount of 0.5 to 1.5% of the glass based upon the weight of the scrap added to the melt.

3,976,475

PROCESS FOR THE RECOVERY OF TANTALUM AND/OR NIOBIUM FROM ACID SOLUTIONS THEREOF

Svend Aage Markland, Follenslev, Denmark, assignor to Atomenergikommissionen, Denmark

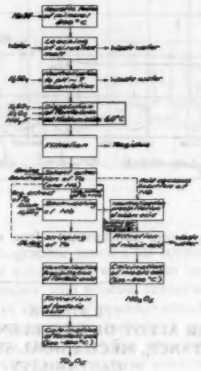
Filed Aug. 20, 1975, Ser. No. 606,380

Claims priority, application Denmark, Aug. 22, 1974, 4490/74

Int. Cl.² C22B 34/24

U.S. Cl. 75—101 BE **8 Claims**

1. A process for the recovery of at least one of the metals tantalum and niobium from an aqueous mineral acid-containing, preferably sulfuric acid-containing, solution containing such metals, by extraction in at least one step by means of an amine, preferably an amine selected from secondary and tertiary, long-chained alkyl amines, in the presence of hydrogen peroxide, and isolating the metal from the organic extract, said process being characterized by the fact that the extraction



of the acid, hydrogen peroxide-containing solution by means of an amine is performed in the presence of fluoride ions.

3,976,476

HIGH TEMPERATURE CAST AUSTENITIC EXHAUST VALVE

Robert Mrdjenovich, 1800 Monticello Drive, Trenton, Mich. 48183

Filed Dec. 23, 1974, Ser. No. 535,925

Int. Cl.² C22C 38/22, 38/38

U.S. Cl. 75—128 A **8 Claims**

1. An austenitic stainless steel casting effective to provide a 100 hour rupture strength of 1650°F of at least 9 k.s.i., a rupture strength of at least 5,000 p.s.i. at a temperature level of 1700°F, a ductility of at least 6% as measured by percent elongation at 1700°F, and a hardness of at least R,30 at 900°F, the steel consisting essentially of, by weight 2.5–4.0% manganese, 6–9% molybdenum, 16–19% chromium, 10–12% nickel, 0.35–0.95% C, the remainder being substantially iron.

3,976,477

HIGH CONDUCTIVITY HIGH TEMPERATURE COPPER ALLOY

Jacob Crane, Woodbridge, and Eugene Shapiro, Hamden, both of Conn., assignors to Olin Corporation, New Haven, Conn.

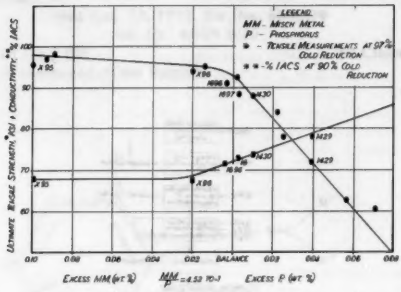
Filed Dec. 23, 1974, Ser. No. 535,221

Int. Cl.² C22C 9/00

U.S. Cl. 75—153 **7 Claims**

1. A heat treated copper base alloy possessing high conductivity which consists, in weight percent, essentially of: from about 0.03 to about 0.5% of an element, selected from the group consisting of the lanthanide series and mixtures thereof, and from about 0.01 to about 0.1% of phosphorus, balance

copper, the lanthanide and phosphorus being added in substantially stoichiometric ratio or proportions and further characterized by being substantially free of low melting point eutectics.

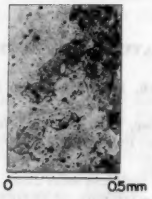

LEGEND
MM - MISCH METAL
P - PHOSPHORUS
% - TENSILE MEASUREMENTS AT 97% COLD REDUCTION
% - % IACS AT 90% COLD REDUCTION
ULTIMATE RUPTURE STRENGTH, 10³ psi
CONDUCTIVITY, % IACS
EXCESS MM (wt %)
EXCESS P (wt %)

3,976,478

COPPER ALLOY OF EXCELLENT CORROSION RESISTANCE, MECHANICAL STRENGTH AND CASTABILITY

Masao Okano, Suwa, Japan, assignor to Toyo Valve Co., Ltd., Tokyo, Japan

Filed Sept. 24, 1975, Ser. No. 616,313
Claims priority, application Japan, May 6, 1975, 50-53264
Int. Cl.² C22C 9/01
U.S. Cl. 75—156.5 9 Claims



1. A copper alloy of excellent corrosion resistance, mechanical strength and castability comprising by weight 5.0 – 6.5% aluminum, 0.2 – 0.5% silicon, 0.2 – 0.5% tin, 0.2 – 4.0% zinc, 1.0 – 1.5% lead and 1.0 – 3.0% iron, the rest being composed of copper.

3,976,479

ALLOY SOLUTION HARDENING WITH SOLUTE PAIRS

John W. Mitchell, Charlottesville, Va., assignor to The United States of America as represented by The United States Energy Research and Development Administration, Washington, D.C.

Filed Mar. 12, 1974, Ser. No. 450,520
Int. Cl.² C22C 9/01
U.S. Cl. 75—162 2 Claims

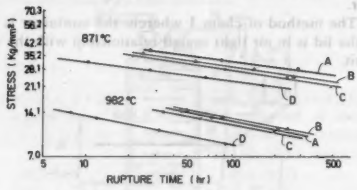
1. A single phase alloy composition consisting essentially of a copper solvent metal and two solutes, said solutes existing as associated pairs within said solvent metal, said solutes being aluminum and palladium in percentages within the range of 1 to 4 atom percent.

3,976,480

NICKEL BASE ALLOY

Rikizo Watanabe, Yasugi, Japan, assignor to Hitachi Metals, Ltd., Tokyo, Japan

Filed Sept. 18, 1974, Ser. No. 507,237
Int. Cl.² C22C 19/05
U.S. Cl. 75—171 5 Claims



1. A forgeable nickel base alloy consisting essentially of, in weight percent, from 0.1 to 0.2% carbon, from 15 to 17.5% chromium, from 8 to 12% cobalt, from 1.5 to 5.5% molybdenum, from 7 to 13% tungsten, from 1.5 to 2.5% aluminum, from 3.7 to 4.3% titanium, no more than 0.3% boron, no more than 0.2% zirconium, the balance being essentially nickel, except for impurities, wherein: the sum of molybdenum and ½ tungsten is 5.5 to 7.5%; the sum of aluminum and titanium is 5.5 to 7.0%; and in case the amount of tungsten is from 7 to 11%, the amount of aluminum is from 1.7 to 2.3%.

3,976,481

WEAR-RESISTANT COMPOSITE MATERIAL

Daniil Andreevich Dudko, ulitsa Anri Barbjusa, 22/27, kv. 143; Grigory Valentinovich Samsonov, ulitsa Vladimirskaya, 51-53, kv. 43; Boleslav Ivanovich Maximovich, ulitsa Anri Barbjusa, 22/26, kv. 99; Vitaly Ivanovich Zelenin, ulitsa Ezhena Potie, 9, kv. 7; Alexandr Sergeevich Klimanov, Bulvar Lesi Ukrainki, 9, kv. 50; Vladimir Nikolaevich Potseluiko, Darnitsky bulvar, 4a, kv. 144; Gennady Vasilievich Trunov, ulitsa Dobrokhotova, 24, kv. 63, and Vasily Mikhailovich Sleptsov, ulitsa Vyborgskaya, 80/17, kv. 55, all of Kiev, U.S.S.R.

Division of Ser. No. 535,155, Dec. 23, 1974, Pat. No. 3,933,482, which is a continuation of Ser. No. 424,075, Dec. 12, 1973, abandoned. This application Nov. 7, 1975, Ser. No. 630,014
Claims priority, application U.S.S.R., Dec. 12, 1972, 1855761
Int. Cl.² B23K 35/22; B23P 3/10
U.S. Cl. 75—171 3 Claims

1. A wear-resistant composite material consisting of 40–80 volume % of a refractory chemical compound in particulate form with a size of 0.3–2 mm and consisting essentially of, by weight, 7–30% chromium, 40–60% titanium and 30–40% boron; and 20–60 volume % of an alloy matrix consisting essentially of, by weight, 12–25% chromium, 1.5–4% silicon, 1–4% boron and the balance being nickel.

3,976,482

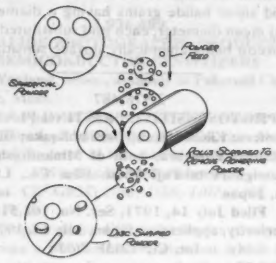
METHOD OF MAKING PREALLOYED THERMOPLASTIC POWDER AND CONSOLIDATED ARTICLE

Jay Michael Larson, Warwick, N.Y., assignor to The International Nickel Company, Inc., New York, N.Y.

Filed Jan. 31, 1975, Ser. No. 546,001
Int. Cl.² B22F 1/00
U.S. Cl. 75—211 25 Claims

1. A process for improving the consolidation behavior of prealloyed powder particles upon compaction, a substantial portion of the particles processed being of a particle size coarser than +325 mesh and which can range up to at least +20 mesh, which comprises imparting strain energy into such powder by cold reducing a substantial portion of the powder

particles by passing them between the rolls of a rolling mill to thus subject them to the compressive forces exerted by the rolls of the mill, whereby substantially discrete powder particles are produced into which strain energy is conferred to render them thermoplastic such that upon heating and compaction a lower flow stress characteristic is obtained than that which obtains in the absence of imparting strain energy.



3,976,483

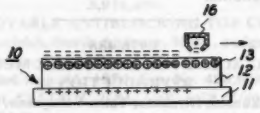
ERASING PROCESS

William L. Goffe, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Jan. 2, 1970, Ser. No. 184

Int. Cl.² G03G *13/00*

U.S. Cl. 96—1 PS **4 Claims**



1. A migration imaging electrical latent image erasing method comprising the steps of:

a. providing an imaging member comprising fracturable migration material in a softenable layer, said softenable layer capable of having its resistance to migration of said fracturable migration material decreased sufficiently to allow migration of said fracturable migration material in depth in said softenable layer, said member having a first electrostatic latent image of a first polarity;

b. electrically charging said member first with a charge of a polarity the same as said first polarity to raise said member in imaging area portions to a surface potential of a magnitude and of a polarity matching said electrostatic latent image followed by charging said member in imaging area portions to charge of a polarity opposite said first polarity to bring said member in imaging area portions to a surface potential of at least about zero potential; and

c. then forming on said member a later electrical latent image, typically differing in composition from said first electrostatic latent image; whereby upon developing said member migration material migrates at least in depth in said softenable layer in an image configuration corresponding to said later electrical latent image and not said first electrostatic latent image.

3,976,484

SCREEN ELECTROPHOTOGRAPHIC PROCESS

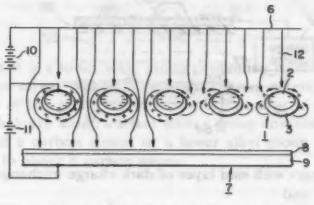
Yujiro Ando, Yokohama; Katsunobu Ohara, and Keiji Tanaka, both of Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 14, 1974, Ser. No. 469,892

Claims priority, application Japan, May 23, 1973, 48-57389; June 19, 1973, 48-69344; Nov. 9, 1973, 48-126038

Int. Cl.² G03G *13/22*

U.S. Cl. 96—1 R **11 Claims**



1. An electrophotographic process for forming an electrostatic latent image in accordance with a light image applied to a photosensitive member, said process comprising;

applying a uniform charge of predetermined polarity to a photosensitive screen which includes a conductive base member having a plurality of fine openings therein, and having a photoconductive material covering one side of the conductive base member and covering the inner peripheries of said openings, wherein the other side of the conductive base member is uncovered, and wherein the application of said charge is performed in the absence of light to charge the side of the screen bearing said photoconductive material;

exposing the screen to image light to form a primary electrostatic latent image thereon, wherein said photoconductive material at said one side and at said inner peripheries is charged in the vicinity of dark areas of the light image, and only said photoconductive material at said inner peripheries is charged in the vicinity of light areas of the light image; and

applying an ion flow from said other side of said photosensitive screen after the primary latent image is formed thereon, wherein said ion flow is applied from a source having a polarity opposite to that of said electrostatic latent image, and simultaneously applying an electric field between the ion flow source and said photosensitive screen in a direction to cause said ions to flow from the ion flow source to said screen, thereby to modulate the ion flow in accordance with the pattern of the image formed on the screen.

3,976,485

PHOTOIMMOBILIZED ELECTROPHORETIC RECORDING PROCESS

Carl F. Groner, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 510,848, Sept. 30, 1974, abandoned, which is a continuation-in-part of Ser. No. 425,044, Dec. 14, 1973, abandoned. This application Aug. 25, 1975, Ser. No. 607,650

Int. Cl.² G03G *17/04*

U.S. Cl. 96—1.2 **38 Claims**

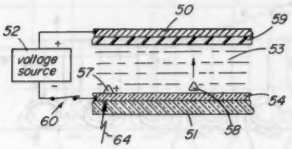
1. A photoimmobilized electrophoretic recording process wherein electrically photosensitive particles, at least some of which bear a positive polarity electrostatic charge, are disposed between two spaced electrodes, subjected to an electric field, and imagewise exposed to activating radiation, one of said electrodes having on the surface thereof adjacent to said particles a uniform layer comprising an amount of a dark

charge exchange material sufficient to provide a net change in charge polarity of at least a portion of said positive polarity particles upon electrical contact therewith in the presence of said field and in the absence of said radiation, said process comprising

a. disposing said particles between said electrodes, and

b. substantially simultaneously

1. establishing a potential difference between said electrodes to create said field such that at least a portion of said positive polarity particles move into electrical



contact with said layer of dark charge exchange material, and

2. imagewise exposing said particles to activating radiation such that at least a portion of the exposed, positive polarity particles are immobilized at the surface of said layer of dark charge exchange material and at least a portion of the unexposed, positive polarity particles, upon electrical contact with said layer of dark charge exchange material, undergo a net change in charge polarity and are repelled therefrom,

whereby an image is formed.

3,976,486

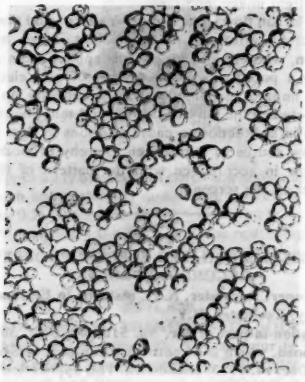
DIFFUSION TRANSFER COLOR PRODUCTS AND PROCESSES WITH SUBSTITUTED HALIDE SILVER HALIDE EMULSIONS

Edwin H. Land, Cambridge, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed July 27, 1973, Ser. No. 383,195

Int. Cl.² G03C 7/00, 1/76, 1/40, 1/02

U.S. Cl. 96—3 **45 Claims**



1. A photographic product comprising a support; a negative-working red-sensitive silver halide emulsion; a negative-working green-sensitive silver halide emulsion; and a negative-working blue-sensitive silver halide emulsion; said silver halide emulsions having associated therewith, respectively, a cyan dye developer, a magenta dye developer and a yellow dye developer; at least two of said silver halide emulsions being predominantly homogeneous substituted-halide silver halide emulsions, the silver halide grains of each said substituted-halide silver halide emulsion having a halide content of 0 to about 10 mole percent iodide and about 1 to 50 mole percent chloride, the remaining halide being bromide, said substituted-halide silver halide grains having been prepared by the replacement of chloride anions of silver chloride or silver iodochloride grains with bromide or bromide and iodide anions, said substituted-halide silver halide grains having a mean diameter within the range of about 0.7 to 1.5 microns, at least 80% of said silver halide grains having a diameter within ± 40% of said mean diameter, each said substituted-halide silver halide emulsion being chemically surface sensitized.

3,976,487

PHOTOSENSITIVE PRINTING PLATE

Kikuo Kubotera; Eiichi Mizuki, both of Asaka; Hideo Kawano, and Tadahiro Fujiwara, both of Minami-ashigara, all of Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed July 14, 1971, Ser. No. 162,516

Claims priority, application Japan, July 14, 1970, 45-61575

Int. Cl.² G03F 7/02

U.S. Cl. 96—33 **2 Claims**

1. A method of producing a master having excellent continuous tone reproducility using a photosensitive printing plate comprising a support having thereon a diffusion transfer hydrophilic image-receiving layer containing nucleating material for physical development, a photosensitive silver halide emulsion layer, and an alginate-containing image-receiving subsidiary layer between said image-receiving layer and said photosensitive emulsion layer, said process comprising:

a. exposing the printing plate to a continuous tone original through a contact screen;

b. chemically developing the resulting latent image in the photosensitive silver halide emulsion layer, whereby a silver image is formed in said image-receiving layer by diffusion of a complex salt of the silver halide from the unexposed portions of the photo-sensitive silver halide emulsion layer through said alginate-containing image-receiving subsidiary layer into the image-receiving layer; and

c. processing the resulting printing material with an etching bleach solution.

3,976,488

TREATING AGENT FOR DIAZO-TYPE MULTICOLOR REPRODUCTION

Kouzi Nihyakumen, Hirakata; Taizo Yokoyama, Osaka; Yasuo Ueda, Kobe; Yasutoki Kamezawa, and Tatsuo Aizawa, both of Osaka, all of Japan, assignors to Mita Industrial Company, Ltd., Osaka, Japan

Continuation of Ser. No. 308,306, Nov. 20, 1972, abandoned, which is a continuation-in-part of Ser. No. 12,049, Feb. 17, 1970, Pat. No. 3,715,213. This application Dec. 16, 1974, Ser. No. 533,257

Claims priority, application Japan, Feb. 19, 1969, 44-11914; Aug. 22, 1969, 44-65980; Nov. 18, 1969, 44-91964

Int. Cl.² G03C 5/34

U.S. Cl. 96—49 **7 Claims**

1. A solid treating agent in the form of a pencil, crayon, chalk or lipstick stick-like writing implement for treating the coupler-applied surface of an original in use for diazo-type multicolor reproduction which consists essentially of a homogeneous composition containing 30–90% by weight based on the total weight of the solid treating agent of a thermovolatile or thermosublimable coupler capable of being coupled with diazonium salt to form a dyestuff, 0–5.0% based on the total weight of the solid treating agent by weight of a coloring material, 5–35% by weight based on the total weight of the solid treating agent of an extender selected from the group consisting of silica, talc, magnesia, clay, diatomaceous earth, activated clay, terra alba, zinc oxide and titanium oxide, and a solid dispersion medium which is solid at room temperature and has a melting point below the volatilization of sublimation point of said coupler in an amount sufficient to provide said

homogeneous mixture from the group consisting of a higher fatty acid having 10 or more carbon atoms or salts thereof, a wax, or a mixture of a higher fatty acid having 10 or more carbon atoms or salts thereof and a wax, said coupler containing treating agent being substantially incapable of forming a dyestuff with said diazonium salt in the absence of an alkaline developing environment

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3,976,489

SILVER HALIDE PHOTOGRAPHIC PRODUCTS WITH SEMICONDUCTOR SENSITIZERS

Boris Levy, Wayland, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Continuation-in-part of Ser. No. 237,787, March 24, 1972, abandoned. This application Apr. 8, 1974, Ser. No. 458,705
The portion of the term of this patent subsequent to Dec. 3, 1991, has been disclaimed.
Int. Cl.² G03C *1/48, 1/28, 1/02, 1/08*
U.S. Cl. 96—76 R **9 Claims**

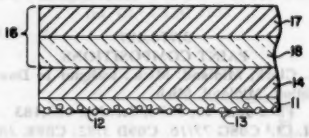
1. A photographic silver diffusion transfer process film unit which comprises a photosensitive element which includes a support, a particulate dispersion of silver halide crystals adapted to be reduced to silver upon contact with a silver halide reducing agent, as a function of said crystals' exposure to incident electromagnetic radiation actinic thereto, having associated therewith in electron donating relationship a sensitizing agent consisting essentially of a water insoluble, inorganic particulate crystalline dispersion of a semi-conductor, said semiconductor comprising one or more elements from Group IIia to VIa, inclusive, of the Periodic Table of Elements, possessing an atomic number 14 and = 81, said semiconductor adapted to donate electrons to said silver halide crystals as a function of the exposure of said element to incident electromagnetic radiation actinic to said element, said silver halide/semiconductor molar ratio ranging from 1:1 to 1:0.01, and, associated with said photosensitive element, a diffusion transfer process receptor element adapted to receive a silver diffusion transfer process image.

3,976,490

REMOVABLE ANTIBLOCKING TOP COAT

William T. Macleish, North Andover, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Aug. 16, 1974, Ser. No. 498,060
Int. Cl.² G03C *1/84, 1/48, 1/78, 1/96*
U.S. Cl. 96—84 R **10 Claims**



1. A photosensitive element which comprises a photosensitive silver halide layer coated on a first surface of a pellucid plastomeric layer and, coated on a second surface of said plastomeric layer, an opaque plastomeric sheet material; said sheet material comprising a substantially water-insoluble, fluid swellable polymeric material adapted to lose adhesive capability upon swelling, thereby separating from said pellucid layer and a top coat comprising particulate material in a binder material, said binder material comprising a hydrophilic polymer and a hydrophobic polymer.

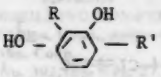
3,976,491

DIAZO COMPOSITIONS AND DIAZOTYPE MATERIALS PREPARED FROM SAME

Robert C. Desjarlais, South Hadley, Mass., assignor to Scott Paper Company, Philadelphia, Pa.

Filed Nov. 26, 1974, Ser. No. 527,409
Int. Cl.² G03C *1/58*
U.S. Cl. 96—91 R **20 Claims**

1. A light-sensitive diazo composition which comprises at least one light-sensitive diazonium compound, an acidic stabilizer, and an azo coupling component of the general formula:



wherein R is a lower alkyl group containing from 1 to about 6 carbon atoms and R' is an aralkyl group wherein the aryl portion of the group either is unsubstituted or is substituted with a halogen atom, a lower alkoxy group containing from 1 to about 6 carbon atoms, or a lower alkyl group containing from 1 to about 6 carbon atoms.

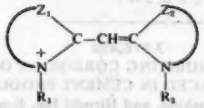
3,976,492

SILVER HALIDE PHOTOGRAPHIC EMULSIONS

Masanao Hinata; Haruo Takei; Akira Sato, and Tadashi Ikeda, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

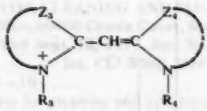
Filed July 25, 1975, Ser. No. 599,312
Claims priority, application Japan, July 25, 1974, 49-85519
Int. Cl.² G03C *1/14, 1/40*
U.S. Cl. 96—100 **17 Claims**

1. A silver halide photographic emulsion containing at least one sensitizing dye represented by the formula (I)



(I)

wherein Z_1 represents a group of atoms necessary to complete a thiazole nucleus, a benzothiazole nucleus, a benzoselenazole nucleus, a naphthothiazole nucleus or a naphthoselenazole nucleus; Z_2 represents a group of atoms necessary to complete a naphthothiazole nucleus or a naphthoselenazole nucleus; and R_1 and R_2, which may be the same or different, each represents an aliphatic group and at least one of R_1 and R_2 is an aliphatic group containing a carboxyl group or a sulfo group; and at least one sensitizing dye represented by the formula (II)



(II)

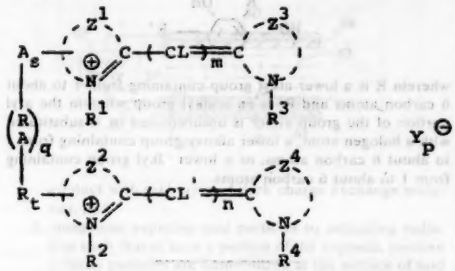
wherein Z_3 and Z_4 which may be the same or different, each represents a group of atoms necessary to complete a thiazole nucleus, a benzothiazole nucleus or a benzoselenazole nucleus; and R_3 and R_4, which may be the same or different, each represents an aliphatic group and at least one of R_3 and R_4 is an aliphatic group containing a carboxyl group or a sulfo group.

3,976,493
PHOTOSENSITIVE COMPOSITIONS CONTAINING LINKED SPECTRAL SENSITIZERS

Alan L. Borror, Lexington, and Louis Cincotta, Andover, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Feb. 18, 1975, Ser. No. 550,181
Int. Cl.² G03C 1/10
U.S. Cl. 96—128 **5 Claims**

1. A photosensitive composition comprising photosensitive silver halide crystals and a spectral sensitizing dye of the formula:



wherein Z^1 is a ring system of the benzothiazole series; Z^2 is a ring system of the benzothiazole or benzimidazole series; Z^3 is a ring system of the benzothiazole, benzimidazole, benzoxazole or benzoselenazole series and Z^4 is a ring system of the benzothiazole series;

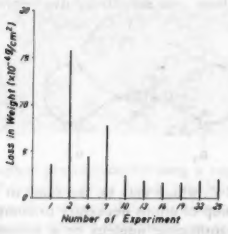
R^1, R^2, R^3 and R^4 each represent an alkyl, alkoxyalkyl, arakyl, carboxyalkyl, sulfoalkyl, carbalkoxyalkyl, aryl, carboxyaryl or cycloalkyl group;

R represents an alkylene group; A represents a divalent amide group; A and R are each linked to an atom of the ring system defined by Z^1 and Z^2 respectively; L and L' each represent a hydrogen atom, lower alkyl group, or aryl group; Y is an acid anionic radical; m and n are each a positive integer from 1 to 7 inclusive; *s* and *t* are each 0 or 1; and *p* and *q* are each 0, 1 or 2; when *s* is 0, *q* is 1 or 2, and when *q* is 0, *s* is 1.

3,976,494
PROCESS FOR INHIBITING CORROSION OF IRON OR STEEL PLACED IN CEMENT PRODUCTS

Norihiro Kudo, Narashino, and Hiroshi Ibe, Koganei, both of Japan, assignors to Onoda Cement Company, Ltd., Yamaguchi, Japan

Filed Dec. 19, 1974, Ser. No. 534,187
Claims priority, application Japan, Dec. 27, 1973, 49-144444; Mar. 12, 1974, 49-27705
Int. Cl.² C04B 7/35
U.S. Cl. 106—14 **10 Claims**



1. A process for inhibiting corrosion of iron or steel placed in cement products containing a chloride which comprises adding to said cement products a nitrite and a polyoxyethylene alkyl phosphoric ester or a nitrite and a bispolyalcohol borate or bis polyalcohol borate alkylate.

3,976,495
METHODS OF INHIBITING THE GROWTH AND PROLIFERATION OF FUNGI USING 3',5'-DIHALO-4'-HYDROXYACETOPHENONE

Stanley J. Buckman; Joseph G. E. Fenyes; John D. Pera, and Lester A. Wienert, all of Memphis, Tenn., assignors to Buckman Laboratories, Inc., Memphis, Tenn.

Filed July 10, 1974, Ser. No. 487,095
Int. Cl.² C09D 5/14
U.S. Cl. 106—15 R **60 Claims**

1. A method of inhibiting fungal deterioration of an organic substance that is susceptible to deterioration by the growth and proliferation of fungi, which comprises adding a 3',5'-dihalo-4'-hydroxyacetophenone to said organic substance in an amount sufficient to inhibit the growth and proliferation of said fungi.

3,976,496
LOCKING PITCH FOR PITCH RESERVOIR NIPPLES

Rudolph W. Wallouch, Lewiston, N.Y., assignor to Airco, Inc., Montvale, N.J.

Continuation of Ser. No. 302,435, Oct. 31, 1972, abandoned. This application Oct. 3, 1974, Ser. No. 511,851
Int. Cl.² C08L 97/02, 95/00
U.S. Cl. 106—123 LC **5 Claims**

1. A heat-foamable, thermoplastic locking pitch composition extrudable at room temperature and adapted to be deposited within a pitch reservoir of a graphite nipple of the type utilized in joining abutting electrode sections, said composition consisting essentially of (a) a major proportion of finely divided particles of coal tar pitch having a softening point between 90°C and 180°C dispersed in (b) a lignin sulfonate based binder and (c) water, said binder and water collectively constituting a minor proportion of said composition and present in amounts to impart to the composition a consistency that causes the composition to be retained in the nipple reservoir without restraint.

3,976,497
PAINT COMPOSITIONS

Harold A. Clark, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

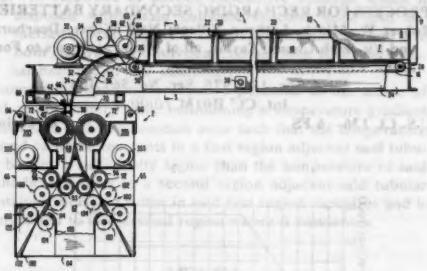
Filed June 25, 1974, Ser. No. 483,183
Int. Cl.² C08G 77/16; C09D 3/82; C09K 3/00
U.S. Cl. 106—287 SE **22 Claims**

1. A paint composition comprising a pigment carried in a vehicle consisting essentially of a dispersion of colloidal silica in a lower aliphatic alcohol-water solution of the partial condensate of a silanol of the formula $RSi(OH)_3$ in which R is selected from the group consisting of alkyl radicals of 1 to 3 inclusive carbon atoms, the vinyl radical, the 3,3,3-trifluoropropyl radical, the gamma-glycidoxypropyl radical and the gamma-methacryloxypropyl radical, at least 70 weight percent of the silanol being $CH_3Si(OH)_3$, said vehicle containing 10 to 60 weight percent solids consisting essentially of 10 to 70 weight percent colloidal silica and 30 to 90 weight percent of the partial condensate, said vehicle containing sufficient acid to provide a pH in the range of 3.0 to 6.0.

3,976,498
SUGARCANE SEPARATION

Sydney Edward Tilby, Winterburn; William C. W. Mason, and Donald William Hodge, both of Edmonton, all of Canada, assignors to Canadian Cane Equipment Ltd., Edmonton, Canada

Filed Nov. 9, 1972, Ser. No. 305,098
Int. Cl.² C13C *1/02*
U.S. Cl. 127—2 **14 Claims**



1. In an apparatus for separating sugarcane stalk material into component parts thereof comprising stalk feeding means, stalk-splitting means, and milling means for separating at least the pith component of the stalk material from the remainder of the stalk material, said stalk feeding means including a pair of oppositely-spaced, rotatable feed rolls, said feed rolls being driven and comprising:

a generally cylindrically-shaped body,

at least an outer portion of said body being composed of a resilient material, and

said outer portion having a plurality of apertures extending end-to-end therethrough;

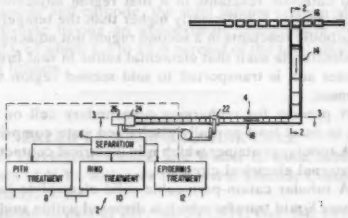
a plurality of tines being mounted in said outer portion and projecting outwardly thereform;

said feed rolls being disposed to resiliently grip sugarcane stalk material therebetween and to impale the sugarcane stalk material with said tines to advance the sugarcane stalk material toward said stalk-splitting means.

3,976,499
METHOD FOR PREPARING SUGARCANE STALKS FOR SUBSEQUENT PROCESSING

Sydney Edward Tilby, Winterburn, Canada, assignor to Canadian Cane Equipment Ltd., Edmonton, Canada

Division of Ser. No. 68,982, Sept. 2, 1970, Pat. No. 3,698,459, which is a division of Ser. No. 693,237, Dec. 20, 1967, Pat. No. 3,566,944. This application Oct. 2, 1972, Ser. No. 294,183
Int. Cl.² C13C *1/00*
U.S. Cl. 127—42 **7 Claims**



1. A method of preparing a mass of randomly oriented slender cane stalks for subsequent processing, the method comprising the steps of:

delivering the mass of cane stalks onto longitudinally aligned conveyor means,

accelerating the mass of cane stalks,

aligning the stalks longitudinally in the direction of travel of the conveyor means,

projecting the mass of stalks at high velocity across a transversely-extending vertical discontinuity in the conveyor to cause the mass of stalks to become at least partially airborne, and

directing fluid transversely through the mass of stalks during their airborne condition to remove trash.

3,976,500
METHOD FOR DISSOLVING NON-FERROUS METALS

Earl J. Fadgen, Jr., Clinton, Conn., assignor to Enthone, Incorporated, West Haven, Conn.

Division of Ser. No. 392,169, Aug. 27, 1973, Pat. No. 3,896,043. This application Mar. 31, 1975, Ser. No. 563,747
Int. Cl.² B08B *3/08*
U.S. Cl. 134—2 **10 Claims**

1. A process for stripping a non-ferrous metal from a ferrous metal substrate without any substantial attack on the ferrous metal substrate, which comprises contacting the non-ferrous metal on the ferrous metal substrate with a non-cyanide alkaline aqueous solution consisting essentially of about 15 to about 85 g/l of a water-soluble nitrate, about 0.1 to about 20 g/l of a water-soluble compound of the formula

wherein R is selected from the group consisting of a valence bond, $-(CH_2)_x-$ wherein x is an integer of 1 to 2,

wherein y is an integer of 1 to 2, and

and M is a hydrophilic cation, about 17 to about 220 g/l of a water-soluble persulfate, about 1 to about 65 g/l of a water-soluble urea compound, and ammonium hydroxide in amount sufficient to adjust the pH to within the range of about 9 to about 10, and maintaining the non-ferrous metal on the ferrous metal substrate in contact with said solution until the non-ferrous metal is dissolved from the ferrous metal substrate.

3,976,501
PROCESS FOR CLEANING AND POLISHING A FLOOR

Maurice R. Blue, 60960 Crown Court, South Bend, Ind. 46614

Filed Sept. 18, 1974, Ser. No. 507,005
Int. Cl.² B08B *7/04*
U.S. Cl. 134—10 **5 Claims**

1. A process for cleaning and polishing a floor, which comprises the steps of: providing in a first tank in a floor cleaning machine a supply of a liquid floor polish composition comprising a film-forming water-insoluble emulsion copolymer, a binder resin dissolved in an aqueous solution of a volatile alkaline solubilizing agent and from 0.05 to 0.5 weight percent of a non-volatile bacteriostatic agent which is compatible with the other ingredients of the floor polish composition, which does not alter the pH of the floor polish composition, which is soluble in the floor polish composition in the range of from

0.05 to 0.5 weight percent, and which is stable, capable of sustained bacteriostatic action and is substantially odorless and colorless and is non-toxic and is selected from the group consisting of bis(hydroxyphenyl)alkanes, polybrominated salicylanilides, p-hydroxybenzoate esters, 1-(3-chloroallyl)-3,5,7-triaza-1-azoniaadamantane chloride, organomer-curials, organotin compounds, formaldehyde and formaldehyde-releasing compounds, phenolics, benzylbromo acetate, zinc pyrithione and halogenated carbanilides, and wherein the solids in said floor polish composition have a particle size of not more than one micron;

applying said liquid floor polish composition from said first tank to a floor coated with an adherent dry film of said floor polish composition and scrubbing said dry film with said liquid floor polish composition to break up said film and to free it from its adhering relationship to the floor whereby the film including soil present therein becomes mixed and is dissolved or suspended in the fresh liquid floor polish composition supplied from said first tank;

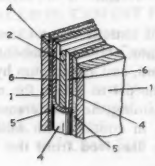
removing excess liquid from the floor, drying the liquid remaining on the floor to form another adherent dry film of said floor polish composition on said floor, and feeding the excess liquid to a second tank in said floor polishing machine, feeding the liquid from the second tank through a filter having a pore size of about one micron or less to filter and remove therefrom all solid particles having a particle size of more than one micron and obtaining a filtrate consisting essentially of cleaned liquid floor polish composition free of soil, and placing the filtrate in the first tank to serve as said liquid floor polish composition therein, the pH of the liquids being continuously maintained in the range of from 9.0 to 9.5 and the liquids being maintained under conditions effective to minimize evaporation of the volatile alkaline solubilizing agent.

3,976,502

NICKEL-ZINC ALKALINE STORAGE BATTERY

Satoshi Sekido, Kyoto; Tsukasa Ohhira, Kadoma; Yutaka Ikeda, Neyagawa, and Takao Yokoyama, Katana, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Dec. 17, 1974, Ser. No. 533,684
Int. Cl.² H01M *10/00*
U.S. Cl. 136—6 GC **3 Claims**



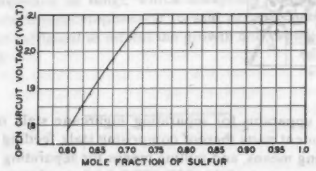
1. A nickel-zinc alkaline storage battery comprising a zinc negative electrode; a nickel positive electrode in spaced relationship to said zinc negative electrode; a separating means provided in the space between said negative and positive electrodes, said separating means being composed of a first non-woven cellulose separator layer disposed on said negative electrode, a second separator layer disposed on said positive electrode and third separator layer of cellulose semipermeable membrane interposed between said first and second separator layers; an electrolyte consisting of an aqueous solution of KOH, which is held on said positive and negative electrodes, and in said separating means, and is controlled in an amount such that free electrolyte does not exist in other places than at said positive and negative electrodes and said separating means; and a container encapsulating said electrodes, separating means and electrolyte, and wherein said second separator layer is composed of a microporous plastic film having dispersed therein 5 to 15 weight percent of fine powder of $Ca(OH)_2$ so as to restrain the oxidation of semipermeable membrane and trap zincate ion, and wherein a gas phase reaction catalyst is provided within said storage battery to promote the reaction between oxygen and hydrogen evolved at the end of charging.

3,976,503

PROCESS FOR RECHARGING SECONDARY BATTERIES

Robert W. Minck, Lathrup Village; Neill Weber, Dearborn, and Yu-chieh Chang, Taylor, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Apr. 14, 1975, Ser. No. 567,464
Int. Cl.² H01M *10/00*
U.S. Cl. 136—6 FS **21 Claims**



1. A process for recharging a secondary cell or battery, which in an at least partially discharged state comprises

A. One or more anodic reaction zones containing a molten alkali metal reactant-anode in electrical contact with an external circuit,

B. One or more cathodic reaction zones containing

1. cathodic reactants selected from the group consisting of (i) a single phase composition comprising molten polysulfide salts of said alkali metal and (ii) a two phase composition comprising molten sulfur and molten sulfur saturated polysulfide salts of said alkali metal and

2. an electrode of porous conductive material which is at least partially immersed in said cathodic reactants,

the residual vapor pressure within said cathodic reaction zone being lower than the vapor pressure of sulfur at the operating temperature of said cell or battery, and

C. A cation-permeable solid electrolyte barrier to mass liquid transfer interposed between and in contact with said anodic and cathodic reaction zones, said porous conductive material being in electrical contact with both said solid electrolyte and an external circuit,

comprising applying a negative potential to the anode of said cell or battery while maintaining a temperature gradient within said cathodic reaction zone such that the temperature of said cathodic reactants in a first region adjacent to said solid electrolyte is sufficiently higher than the temperature of said cathodic reactants in a second region not adjacent to said solid electrolyte such that elemental sulfur in said first region vaporizes and is transported to said second region where it condenses.

6. A process for recharging a secondary cell or battery, which in an at least partially discharged state comprises

A. A tubular container which is in electrical contact with an external electrical circuit,

B. A tubular cation-permeable solid electrolyte barrier to mass liquid transfer which is disposed within said tubular container so as to create an anodic reaction zone within said tubular barrier and a cathodic reaction zone between said tubular barrier and said tubular container, the residual vapor pressure within said cathodic reaction zone being lower than the vapor pressure of sulfur at the operating temperature of said cell or battery,

C. A molten alkali metal anodic reactant within said anodic reaction zone in electrical contact with said external electrical circuit,

D. Cathodic reactants within said cathodic reaction zone selected from the group consisting of (1) a single phase composition comprising molten polysulfide salts of said anodic reactant and (2) a two phase composition comprising molten sulfur and molten polysulfide salts of said anodic reactant, and

E. An electrode of porous conductive material which is disposed within said cathodic reaction zone and immersed at least in part in said cathodic reactants and is in both electrical and physical contact with both said tubular barrier and said container,

comprising applying a negative potential to the anode of said cell or battery while maintaining a temperature gradient within said cathodic reaction zone such that the temperature of said cathodic reactants in a first region adjacent said tubular barrier is sufficiently higher than the temperature of said cathodic reactants in a second region adjacent said tubular container such that sulfur in said first region vaporizes and is transported to said second region where it condenses.

3,976,504

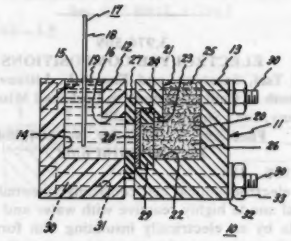
SEALED LITHIUM-IODINE CELL

Gregory C. Farrington, Elnora, and Walter L. Roth, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 517,512, Oct. 24, 1974, abandoned. This application June 23, 1975, Ser. No. 589,135

Int. Cl.² H01M 4/36

U.S. Cl. 136—83 R **5 Claims**



1. A sealed lithium-iodine cell comprises a casing, an anode positioned within the casing, the anode selected from the class consisting of lithium, lithium as an amalgam and lithium in a nonaqueous electrolyte, a cathode positioned within the casing, the cathode selected from the class consisting of iodine, and iodine with an ionic conductivity enhancing material, and a solid lithium-sodium aluminate electrolyte positioned within the casing between the anode and cathode and in contact with both the anode and cathode, the solid lithium-sodium aluminate electrolyte having an approximate composition of $LiNaO.9Al_2O_3$ of which 1.3 to 85.0 percent of the total alkali ion content is lithium.

3,976,505

SEALED LITHIUM-BROMINE CELL

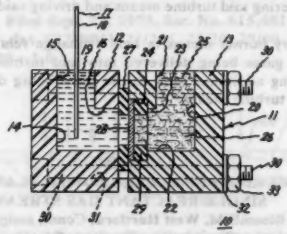
Gregory C. Farrington, Elnora, and Walter L. Roth, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 517,511, Oct. 24, 1974, abandoned. This application June 23, 1975, Ser. No. 589,137

Int. Cl.² H01M 4/36

U.S. Cl. 136—83 R **4 Claims**

1. A sealed lithium-bromine cell comprises a casing, an anode positioned within the casing, the anode selected from the class consisting of lithium, lithium as an amalgam and lithium in a non-aqueous electrolyte, a cathode positioned within the casing, the cathode comprising bromine with an ionic conductive enhancing material, and a solid lithium-sodium aluminate electrolyte positioned within the casing



between the anode and cathode, the solid lithium-sodium aluminate electrolyte having an approximate composition of $LiNaO.9Al_2O_3$ of which 1.3 to 85.0 percent of the total alkali ion content is lithium.

3,976,506

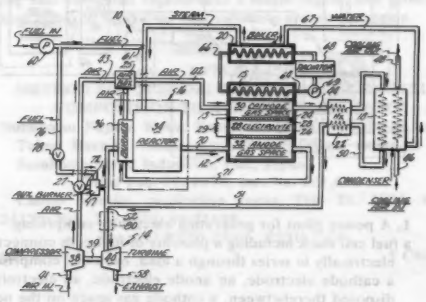
PRESSURIZED FUEL CELL POWER PLANT WITH AIR BYPASS

Michael B. Landau, West Hartford, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Feb. 12, 1975, Ser. No. 549,598

Int. Cl.² H01M 8/06

U.S. Cl. 136—86 R **17 Claims**



1. A power plant for generating electricity comprising:

a fuel cell stack including a plurality of fuel cells connected electrically in series through a load, each cell comprising a cathode electrode, an anode electrode, an electrolyte disposed therebetween, a cathode gas space on the nonelectrolyte side of said cathode electrode and an anode gas space on the nonelectrolyte side of said anode electrode;

compressor means including a compressor operably connected to turbine means for compressing air to greater than 2 atmospheres pressure;

means for delivering air at a pressure of at least 2 atmospheres from said compressor into said cathode gas space;

fuel conditioning apparatus including reactor means for producing hydrogen from a hydrogen containing fuel;

burner means for providing heat to said reactor means;

means for delivering pressurized hydrogen containing fuel into said reactor means;

means for delivering pressurized hydrogen from said fuel conditioning apparatus into said anode gas space;

means for delivering anode effluent gases into said burner means for providing fuel to said burner means;

means for bypassing, at part power, a portion of the compressed air from said compressor around said cathode gas space;

means for delivering effluent gases from said cathode gas space, effluent gases from said burner means, and said bypassed compressed air into said turbine means for powering said turbine means and driving said compressor; and

auxiliary burner means in heat exchange relationship with said gases being delivered into said turbine means, for adding additional heat to the gases being delivered into said turbine means.

3,976,507

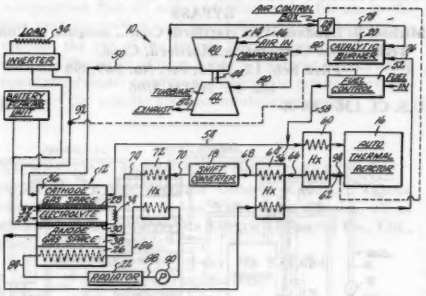
PRESSURIZED FUEL CELL POWER PLANT WITH SINGLE REACTANT GAS STREAM

David P. Bloomfield, West Hartford, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Feb. 12, 1975, Ser. No. 549,602

Int. Cl.² H01M *8/06*

U.S. Cl. 136—86 R **14 Claims**



1. A power plant for generating electricity comprising:

a fuel cell stack including a plurality of fuel cells connected electrically in series through a load, each cell comprising a cathode electrode, an anode electrode, an electrolyte disposed therebetween, a cathode gas space on the nonelectrolyte side of said cathode electrode and an anode gas space on the nonelectrolyte side of said anode electrode;

compressor means including a compressor operably connected to turbine means;

means for delivering air at a pressure of at least two atmospheres from said compressor into said cathode gas space;

fuel conditioning apparatus including an autothermal reactor;

means for delivering effluent gases from said cathode gas space and pressurized hydrogen containing fuel into said autothermal reactor;

means for delivering pressurized hydrogen from said fuel conditioning apparatus into said anode gas space;

means for delivering anode gas space effluent gases into said turbine means for powering said turbine means and driving said compressor; and

means disposed downstream of said anode gas space for increasing the temperature of the anode gas space effluent gases before they are delivered into said turbine means, including a burner and means for delivering anode gas space effluent gases into said burner to provide fuel therefor.

3,976,508

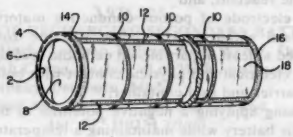
TUBULAR SOLAR CELL DEVICES

Abraham I. Mlavsky, Lincoln, Mass., assignor to Mobil Tyco Solar Energy Corporation, Waltham, Mass.

Filed Nov. 1, 1974, Ser. No. 519,920

Int. Cl.² H01L *31/00;* **F24J** *3/02;* **H01L** *27/14*

U.S. Cl. 136—89 **35 Claims**



1. A solar cell unit comprising a tubular semiconductor body having an outer radiation-receiving region of a first conductivity type and an inner region of a second opposite conductivity type separated by a P-N or N-P junction, and electrically conductive contacts for coupling said outer and inner regions to an external circuit.

13. A solar cell unit comprising a tubular electrically semiconductive body having a radiation-receiving outer surface and an inner surface, said body also having annular regions of N-type conductivity and P-type conductivity that are separated by a P-N junction, one of said regions being contiguous with said outer surface and the other of said regions being contiguous with said inner surface, said P-N junction extending generally parallel with and lying close to said outer surface, and contact means on said outer and inner surfaces for coupling said cell to an external circuit.

3,976,509

ELECTROLYTE COMPOSITIONS

Keh Chi Tsai, Saratoga, and Ernest L. Littauer, Los Altos Hills, both of Calif., assignors to Lockheed Missiles & Space Company, Inc., Sunnyvale, Calif.

Filed Apr. 4, 1975, Ser. No. 564,984

Int. Cl.² H01M *6/04*

U.S. Cl. 136—154 **9 Claims**

1. An electrochemical cell consisting essentially of a reactive metal anode highly reactive with water and spaced from a cathode by an electrically insulating film formed on said anode in the presence of water, an aqueous alkaline electrolyte in which said anode and cathode are immersed, said electrolyte permitting, at the anode, electrochemical dissolution of reactive metal to aqueous reactive metal ions, formation of an aqueous salt to a solid salt in the form of a porous film on the anode and, at the cathode, reduction of water, and an organic solvent in said electrolyte which reduces direct corrosion/parasitic reaction at said anode by hydrogen bonding with the water in said electrolyte while having only a minor inhibiting influence on said anode-cathode reactions, said organic solvent being at least one alcohol selected from the group of alcohols consisting of methyl alcohol, ethylene glycol, glycerol, ethyl alcohol, allyl alcohol and propyl alcohol.

3,976,510

BATTERY RECOMBINATION REACTOR SYSTEM

August Winsel, Kelkheim, Taunus, and Helmut Laig-Horstebrock, Frankfurt am Main, both of Germany, assignors to Varta Batterie Aktiengesellschaft, Hannover, Germany

Filed Oct. 31, 1974, Ser. No. 519,517

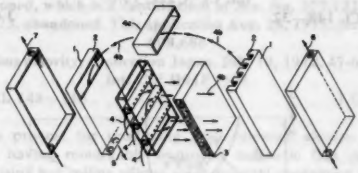
Claims priority, application Germany, Nov. 19, 1973, 2357631

Int. Cl.² H01M *8/06*

U.S. Cl. 136—181 **8 Claims**

1. A catalytic oxidation reactor, particularly for the recombination of hydrogen and oxygen evolved in secondary galvanic elements, comprising:

a catalyst-bearing porous layer;
means for introducing the evolved hydrogen and oxygen in distributed manner along one face of the layer;
means providing a first space for the collection of recombination product along the opposite face of the layer;

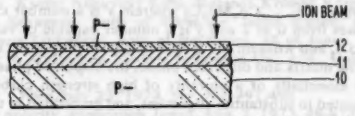


means for ducting the collected product into a second space adjacent the distributed introducing means; and
means for cooling the collected product both in the first and second space.

3,976,511
METHOD FOR FABRICATING INTEGRATED CIRCUIT STRUCTURES WITH FULL DIELECTRIC ISOLATION BY ION BOMBARDMENT

William Stanford Johnson, Hopewell Junction, N.Y., assignor to IBM Corporation, Armonk, N.Y.

Filed June 30, 1975, Ser. No. 592,151
Int. Cl.² H01L 21/263
U.S. Cl. 148—1.5 21 Claims

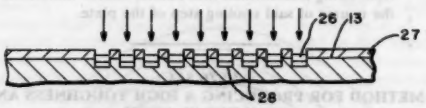


1. A method of forming an electrically insulated integrated circuit comprising
forming a subsurface electrically insulating layer in a monocrystalline semiconductor substrate by
bombarding a surface of said substrate with ions of at least one element selected from the group consisting of nitrogen, oxygen, and carbon,
maintaining the bombardment for a time sufficient to produce an ion concentration of at least 10^{19} ions/cm³ and at an energy level sufficient to result in ion penetration to a selected depth, and
heating the resultant bombarded substrate to a temperature sufficient to react the ions introduced by the bombardment with the substrate,
epitaxially depositing a monocrystalline layer of the same semiconductor material as said substrate on said surface,
forming a pattern of regions of electrically insulating material extending through said epitaxial monocrystalline layer and beyond said substrate surface into contact with said subsurface layer to laterally surround a plurality of pockets of said semiconductor material,
forming an electrically insulative layer on the surface of said expitaxial layer continuous with said electrically insulating regions,
removing said substrate below said subsurface layer to expose said subsurface layer, and
etching away said subsurface layer.

3,976,512
METHOD FOR REDUCING THE DEFECT DENSITY OF AN INTEGRATED CIRCUIT UTILIZING ION IMPLANTATION

Vittorio De Nora, Nassau, Bahamas, and Bohumil Polata, Los Altos, Calif., assignors to Signetics Corporation, Sunnyvale, Calif.

Filed Sept. 22, 1975, Ser. No. 615,481
Int. Cl.² H01L 21/265, 21/20, 29/06
U.S. Cl. 148—1.5 1 Claim

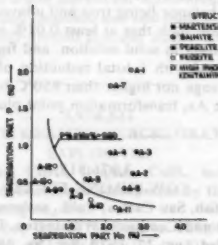


1. In a method for reducing the defect density of an integrated circuit having a semiconductor substrate, a buried region and an epitaxial layer grown over said substrate and buried region, said epitaxial layer including a plurality of integrated devices occupying a predetermined extended area which is substantially coextensive with said buried region said method comprising the following steps: providing a semiconductor substrate having a surface; forming a grated mask on said surface having alternate elongated portions respectively covering and exposing said surface; forming a relatively thin, compared to said mask, protective layer; covering exposed portions of said surface by a thermal oxide growth technique in which a portion of said substrate is used up in the formation of the thin layer; ion-implanting conductivity determining impurities through said protective layers and into said semiconductor body to form a plurality of elongated regions; merging said elongated regions into a single region; and growing said epitaxial layer over said substrate and single region.

3,976,513
METHOD FOR JUDGING THE FITNESS OF A STEEL COMPOSITION TO A CASTING PRACTICE

Nobukatsu Fujino, Kobe; Kazuo Yamanaka, Toyonaka, and Takeo Harada, Nishinomiya, all of Japan, assignors to Sumitomo Metal Industries, Ltd., Japan

Filed Feb. 21, 1975, Ser. No. 551,650
Claims priority, application Japan, Feb. 21, 1974, 49-21170; Feb. 21, 1974, 49-21169
Int. Cl.² B22D 25/06; C21D 7/14
U.S. Cl. 148—2 1 Claim



1. In the manufacture of steel plate of at least 15mm thickness comprising the steps of casting a molten steel, rolling the obtained ingot or slab into a steel plate and cooling the as-rolled steel plate at such a rate that the center portion of the steel plate is cooled at a rate lower than 6℃/sec, a method for judging, whether or not, the chemical composition of the molten steel is suitable for a particular casting practice, said method comprising the steps of:

measuring the manganese and phosphorous concentrations of the molten steel to be cast;

calculating the product of the manganese and phosphorous concentrations;

comparing said product to be the value of $0.60/f$, wherein f is a segregation factor inherent to said particular casting practice and has been previously determined; and,

if said product is larger than $0.60/f$, deciding not to conduct said particular casting practice, and if said product is less than $0.60/f$, deciding to conduct the same, thereby preventing the segregated portion of the rolled steel plate from being transformed into bainite and/or martensite in the course of said cooling step of the plate.

3,976,514

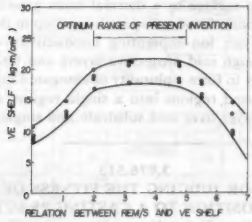
METHOD FOR PRODUCING A HIGH TOUGHNESS AND HIGH TENSIL STEEL

Kameo Matsukura; Kunio Watanabe; Yoshio Hashimoto, all of Sakai; Masatoki Nakayama; Hajime Nakasugi, both of Kisarazu, and Tetuo Takeda, Kimitsu, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Feb. 10, 1975, Ser. No. 548,617

Int. Cl.² C21D 7/14

U.S. Cl. 148—12 F 3 Claims



1. A method for producing a high toughness and high tensile steel which comprises heating a steel containing 0.04 to 0.16% of carbon, 0.10 to 0.50% of silicon, 1.0 to 1.70% of manganese, not more than 0.025% of phosphorus, not more than 0.005% of sulfur, 0.010 to 0.060% of aluminum, one or more 0.01 to 0.06% of niobium, and 0.01 to 0.15% of vanadium, 0.005 to 0.025% of REM under the condition of REM/S = 2 to 5, with the balance being iron and unavoidable impurities, to a temperature such that at least 0.01% of the steel is niobium or vanadium in solid solution, and finishing rolling the thus heated steel with a total reduction of 50 to 85% in a temperature range not higher than 850°C but not lower than the sum of the Ar_3 transformation point plus 30°C.

3,976,515

LOW-FUMING FLUXES

Daniel R. English, San Carlos, Calif., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Aug. 27, 1973, Ser. No. 391,527

Int. Cl.² B23K 35/365

U.S. Cl. 148—26 10 Claims

1. In a flux composition used in galvanizing, hot-tinning, terne coating and can seam sealing and activated by ammonium chloride the improvement wherein a total ammonium chloride content of from 3 to about 18% by weight of the flux composition is present in the flux composition and said ammonium chloride has at least 90% by weight of the particles of the size of U.S.S. Screen of −2 mesh to +8 mesh

3,976,516

HIGH TEMPERATURE ALLOY

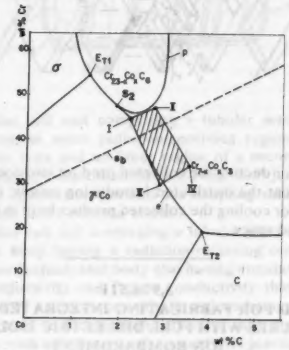
Peter Sahm, Neckargemund, Germany, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed Oct. 17, 1974, Ser. No. 515,695

Claims priority, application Germany, Oct. 17, 1973, 2351989

Int. Cl.² C22C 19/07

U.S. Cl. 148—32 3 Claims



1. In the cast anisotropic body comprising an at least partially monovariant ternary eutectic alloy of Co, Cr and C, the eutectic part of the alloy comprising a matrix phase consisting essentially of Co containing at least Cr in a solid solution and a dispersed phase consisting essentially of a carbide of the formula $Cr_{7-x-y}Co_xMe_yC_3$ wherein x is a number capable of values from 0 to 2 and y is a number capable of values from 0 to 4, and wherein Me is an additional component contained in the matrix and dispersed phase, the dispersed phase consisting essentially of a plurality of high strength carbide fibers oriented in substantial alignment, and embedded in the matrix phase, the improvement which comprises the additional component Me being aluminum in amounts from 0.1 to 3% by weight based on the total weight of the composition.

3,976,517

PROCESSING FOR GRAIN-ORIENTED SILICON STEEL

Denis A. Blank, Springdale; Edward C. Falkowski, Pittsburgh, and Richard K. Pitler, Gibsonia, all of Pa., assignors to Allegheny Ludlum Industries, Inc., Pittsburgh, Pa.

Filed July 15, 1975, Ser. No. 596,558

Int. Cl.² H01F 1/04

U.S. Cl. 148—111 2 Claims

1. In a process for producing electromagnetic silicon steel having a cube-on-edge orientation and a permeability of at least 1850 (G/O_e) at 10 oersteds, which process includes the steps of: preparing a melt of silicon steel containing, by weight, up to 0.07% carbon, from 2.8 to 4.0% silicon, from 0.03 to 0.24% manganese, from 0.01 to 0.09% of material from the group consisting of sulfur and selenium, from 0.015 to 0.04% aluminum, up to 0.02% nitrogen, up to 0.5% copper and up to 0.0035% boron; casting said steel into an ingot; soaking said ingot at an elevated temperature; hot rolling said ingot into a bar, said bar being less than 2 inches thick; hot rolling said bar into band, said band being less than 0.2 inch thick; heat treating said steel; cold rolling said steel at a reduction of at least 75%; decarburizing said steel; and final texture annealing said steel; the improvement comprising the step of commencing said hot rolling of said bar into said band when said bar is at a temperature of from 1800° to 1900°F.

3,976,518

PROCESS FOR PRODUCING GRAIN-ORIENTED ELECTRIC STEEL SHEETS HAVING REMARKABLY IMPROVED MAGNETIC FLUX DENSITY

Katuro Kuroki, Kitakyushu, Japan, assignor to Nippon Steel Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 529,515, Dec. 4, 1974, abandoned, which is a continuation of Ser. No. 377,122, July 6, 1973, abandoned. This application Aug. 28, 1975, Ser. No. 608,686

Claims priority, application Japan, July 10, 1972, 47-68891

Int. Cl.² H01F 1/04

U.S. Cl. 148—113 2 Claims

1.

In a process for producing grain-oriented electric steel sheets having remarkably improved magnetic flux density comprising hot rolling silicon steel material containing 0.025 to 0.085% C, 2.0 to 4.0% Si, 0.010 to 0.065% acid soluble Al, continuously annealing the steel at a high temperature between 950°and 1200°C before final strong cold rolling, rapidly cooling the steel to precipitate AlN, cold rolling the steel by a one-step or two-step cold rolling including a final strong cold rolling with a reduction rate range of 81 to 95% into a final thickness, coating a separating agent on the sheet after decarburization annealing, and subjecting the sheet to final annealing to obtain a grain oriented electric steel sheet having excellent excitation characteristics and B_8 characteristics of at least more than 1.90 Wb/m², the improvement which comprises effecting the final annealing by applying a separating agent with antimony or an antimony-containing compound (excluding alkali metal compound) added in 0.2 – 15% by weight as antimony.

3,976,519

MACHINABLE ANISOTROPIC PERMANENT MAGNETS OF Mn-Al-C ALLOYS

Takao Kubo, Kawachinagano; Tadao Ohtani, Katano; Shigeru Kojima, Kyoto; Nobuyuki Kato, Katano; Kiyoshi Kojima; Yoichi Sakamoto, both of Hirakata; Isago Konno, and Masaharu Tsukahara, both of Neyagawa, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed July 23, 1974, Ser. No. 491,498

Claims priority, application Japan, Aug. 2, 1973, 48-87391; Sept. 19, 1973, 48-106311

Int. Cl.² H01F 1/00

U.S. Cl. 148—120 7 Claims

1. An anisotropic permanent magnet of an alloy which comprises 68.0 to 73.0 % by weight of manganese, carbon in an amount between the solubility limit and (⅛Mn—22.2)% and the remainder being aluminum, said alloy having been subjected to warm plastic deformation and wherein the anisotropic permanent magnet exhibits magnetic properties such that the (BH)max is above 4.8×10^6 G.Oe in its bulk state, and is further characterized in being machinable.

3,976,520

PIPE AND PROCESS FOR PRODUCING A WELDED AND QUENCH HARDENED STEEL

Friedhelm Reinke; Hermann Voss, both of Remscheid, and Herbert Geisel, Remscheid-Luttringhausen, all of Germany, assignors to AEG Elotherm G.m.b.H., Remscheid, Germany

Filed Apr. 8, 1974, Ser. No. 459,208

Claims priority, application Germany, Apr. 21, 1973, 2320428

Int. Cl.² C21D 9/08

U.S. Cl. 148—127 10 Claims

6. A method of producing welded and hardened steel pipes comprising the steps of:

welding a seam along the length of a pipe with weld material comprised of nickel steel having an electrical resistance considerably higher than the electrical resistance of the pipe, at least below the hardening temperature,

inductively hardening said pipe and weld seam by moving along the length of said pipe a coil having at least a single coil extending about said pipe to induce current flow in

said pipe and seam so as to inductively heat and harden said pipe and seam and applying a quenching medium to said heated pipe.

3,976,521

METHOD OF COATING BORON PARTICLES WITH AMMONIUM PERCHLORATE

Durrell D. Boyd, Annandale, and Lewis B. Childs, Springfield, both of Va., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Nov. 20, 1974, Ser. No. 525,337

Int. Cl.² C06B 21/00

U.S. Cl. 149—5 2 Claims

1. A method for providing boron particles with a coating of ammonium perchlorate which comprises the steps of:

a. dissolving ammonium perchlorate in anhydrous liquid ammonia;

b. adding a volatile diluent and finely-divided boron to said ammonia said diluent being miscible with said liquid ammonia but a non-solvent for ammonium perchlorate;

c. evaporating said ammonia and said diluent under vacuum to form a finely-divided granular ammonium perchlorate coated boron.

3,976,522

NITROPLASTICIZED AMINE PERCHLORATE FLEXIBLE EXPLOSIVES

Julius Rothenstein, Citrus Heights, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 26, 1971, Ser. No. 168,506

Int. Cl.² C06B 45/10, 43/00

U.S. Cl. 149—19.4 3 Claims

1. A castable, thermally stable, non-thermoplastic flexible explosive comprising an explosive filler consisting of a mixture of methylamine perchlorate and cyclotrimethylene trinitramine and a binder, said binder consisting of a mixture of a readily curable prepolymer from the group consisting of a polyurethane, a copolymer of dinitroropyl acrylate and a copolymer of hydroxyalkylacrylates, a crosslinking agent and a curing agent.

3,976,523

METHOD OF MANUFACTURING HIGH-FREQUENCY RASTER WITH IRREGULAR STRUCTURE OF RASTER ELEMENTS

Viktoria Ivanovna Andreeva, 3 Rybinskaya ulitsa 21, korpus 2, kv. 249; Alexandra Ljudovikovna Popova, ulitsa Usievicha 3, kv. 88, and Veniamin Semenovich Lapatukhin, Teply Stan, ulitsa Ostrovityanova, mikroraion 1a, korpus 16, kv. 16, all of Moscow, U.S.S.R.

Filed Mar. 15, 1974, Ser. No. 451,599
Int. Cl.² C03C *15/00, 25/06*
U.S. Cl. 156—6 **6 Claims**

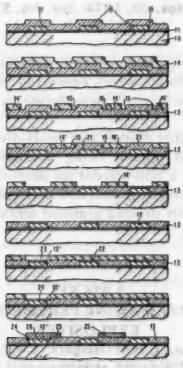
1. A method of manufacturing an optical high-frequency raster with an irregular structure of raster elements, the raster comprising a substantially plane-parallel glass plate having microroughnesses with a value Ra equal to 0.20 to 0.26 mu on both surfaces; the method comprising the steps of mechanically grinding the glass plate with an abrasive compound at both sides, each for about 40 minutes, to obtain a uniform surface structure; thoroughly washing the ground glass plate with water; and subjecting the ground and washed glass plate to multiple etching, at least three times, to obtain transparent microroughnesses with a value Ra equal to 0.20 to 0.26 mu; whereby the resulting optical high-frequency raster has a high resolving power of at least 25 mm^{-1}, and is capable of transmitting an interval of optical densities between approx. 1.0 and 1.2.

3,976,524

PLANARIZATION OF INTEGRATED CIRCUIT SURFACES THROUGH SELECTIVE PHOTORESIST MASKING

Bai-Cwo Feng, Wappingers Falls, N.Y., assignor to IBM Corporation, Armonk, N.Y.

Filed June 17, 1974, Ser. No. 480,086
Int. Cl.² B05D *3/04, 3/12*
U.S. Cl. 156—8 **29 Claims**



1. A method of photoresist masking comprising
forming, on a substrate surface having a pattern of elevated areas and a complementary pattern of unelevated areas, a photoresist pattern in registration with said pattern of unelevated areas, said photoresist pattern having narrower lateral dimensions than said unelevated pattern whereby said registration is facilitated, and
flowing said photoresist pattern by treating said photoresist with a photoresist solvent to laterally expand the photoresist to cover and thereby mask said unelevated areas.

16. A method for forming a dielectrically isolated integrated semiconductor circuit comprising
forming in a semiconductor substrate a pattern of trenches extending from a surface of said substrate, said trench pattern laterally enclosing respectively a plurality of pockets of said semiconductor substrate,
forming over said semiconductor substrate a layer of electrically insulative material whereby said layer has a pattern of depressed areas corresponding to and filling said trench pattern and a complementary pattern of undepressed areas,
forming in said depressed areas a photoresist pattern in registration with said depressed area pattern, said photoresist pattern having narrower lateral dimensions than said depressed area pattern whereby registration is facilitated,
flowing said photoresist pattern by treating said photoresist with a photoresist solvent to laterally expand the photoresist to cover and thereby mask said depressed areas, and
etching to lower said undepressed areas of said insulative layer.

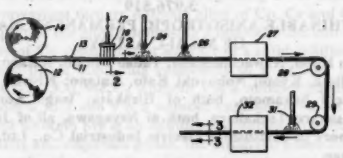
22. The method of claim 21 wherein said third layer comprises silicon dioxide.

3,976,525

METHOD OF MAKING A NEEDLED SCOURING PAD

Edward Mednick, Skokie, Ill., assignor to Fiber Bond Corporation, Chicago, Ill.

Division of Ser. No. 387,329, Aug. 10, 1973, Pat. No. 3,862,522. This application Oct. 24, 1974, Ser. No. 517,444
Int. Cl.² B24D *3/32, 3/34;* B32B *5/06*
U.S. Cl. 156—72 **2 Claims**



1. A method of preparing a composite scouring pad which comprises placing a non-woven layer and a flexible foam layer in juxtaposition to each other, passing a plurality of barbed needles through the non-woven layer and thence through the foam layer whereby some fibers from said non-woven layer are passed through said foam layer and emerge from the side of said foam layer opposite said non-woven layer, impregnating said non-woven layer with a resinous binder material containing abrasive particles and coating with a resinous material applied in liquid form the surface of said foam layer opposite said non-woven layer and the emergent fibers thereon, said resinous material being applied in an amount such that the thickness of the coating produced thereby does not impair the roughness of said surface provided by said emergent fibers, whereby said emergent fibers are anchored in position traversing the thickness of said foam layer.

3,976,526

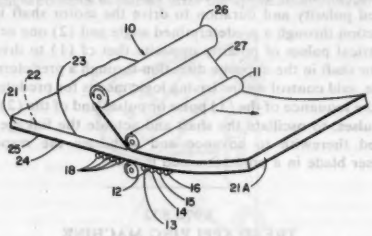
PREPARATION OF CURVED COMPOSITE PANEL CONTAINING A RIGID FOAMED PLASTIC

William P. Hovey, Mount Pleasant, and James J. Kubiak, Midland, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Sept. 16, 1974, Ser. No. 506,363
Int. Cl.² B29C *17/04*
U.S. Cl. 156—212 **2 Claims**

1. A method for the preparation of a curved composite laminated plastic foam-containing panel, the steps of the method comprising

providing a rigid foam plastic body having at least a first generally planar major surface and a second generally planar major surface, the second surface having a first facing sheet adhered thereto, the first and second surfaces being generally parallel,



bending the body to provide a body having a generally concave configuration of the first major surface,

applying to the first major surface of the body and

adhering to the body a second facing sheet, the second facing sheet being applied and adhered to the body at a location along a line where the body is bent.

3,976,527

METHOD OF EXTRUDING THERMOPLASTIC FILMS

Kenneth Thompson, Waynesville, N.C., and Richard C. Ihde, Parma Heights, Ohio, assignors to U.S. Plywood-Champion Papers Inc., Hamilton, Ohio

Continuation of Ser. No. 856,360, Sept. 9, 1969, abandoned, which is a division of Ser. No. 530,119, Feb. 25, 1966, Pat. No. 3,482,278. This application Sept. 13, 1972, Ser. No. 288,773

Int. Cl.² B29B *5/00*; B29F *3/06*

U.S. Cl. 156—244 **33 Claims**

1. In the method of forming paperboard cartons whose bottom structure is formed by folding bottom panels about a major horizontal bottom score line, the steps comprising:

extruding a film of a unitary profiled thermoplastic polymer onto a paperboard web, said film having a thick strip overlying an area of the web in which said score line is to be formed, said thick strip being of such a thickness to withstand scoring, forming, sealing and other stresses in the area of said score line, which stresses are in excess of those to which other areas of the carton are exposed, and said thick strip being of greater thickness than adjacent portions of said film; and

thereafter scoring and cutting said web to form individual carton blanks, said scoring including forming said major horizontal score line within the area of the web covered by said thick strip of film.

3,976,528

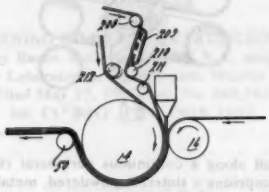
LAMINATING METHOD

Albert L. James, Hickory Corners, Mich., assignor to Cadillac Products, Inc., Sterling Heights, Mich.

Continuation-in-part of Ser. No. 259,479, June 5, 1972. This application Nov. 19, 1973, Ser. No. 417,214

Int. Cl.² B32B *7/00*

U.S. Cl. 156—244 **13 Claims**



1. A method for preparing a heat sealed, dry, laminated product of at least four ply wherein the first ply is a substrate layer, the second ply is a thin extruded film-forming plastic material made of a dissimilar plastic material relative to the first ply and having a thickness as small as about 1/6 mil, the third ply is a material layer made of dissimilar material relative to the second ply, and the fourth ply is a plastic material layer having a treated surface, said fourth ply being made of a dissimilar material relative to the third ply, said treated surface being formed by flame treatment or electronic treatment, said method comprising the steps of: preheating at least one of said third and fourth plies to a temperature between about 140°F and about 450°F in order to assist same in bonding to one another, heating said film-forming plastic material to form a hot extruded film-forming plastic material of sufficiently elevated temperature such that it will generally help cause a heat sealed bond between the third and fourth ply materials, bringing the substrate layer into firm contact with the hot extruded film-forming plastic material between a pair of moving surfaces, preventing the plies from contacting one another substantially until they are brought together between the moving surfaces, essentially simultaneously bringing the third ply layer into firm contact between said moving surfaces with the extruded film-forming plastic material whereby said extruded material effectively bonds the first ply to the third ply, and essentially simultaneously bringing the fourth ply plastic material into firm contact between said moving surfaces such that said surface thereof is in contact with the third ply, thus producing a heat sealed bond between the third and fourth ply due in substantial part to the heat generated by the hot extruded plastic material and also due in part to said preheating.

3,976,529

METHOD OF SEALING FILTER IN TUBULAR FITTING FOR MEDICAL INJECTION EQUIPMENT AND THE LIKE

Theodore E. Weichselbaum, Normandy, Mo., assignor to Sherwood Medical Industries Inc., St. Louis, Mo.

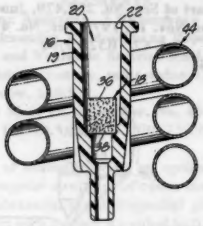
Division of Ser. No. 323,726, Jan. 15, 1973, Pat. No. 3,817,389. This application Jan. 31, 1974, Ser. No. 438,298

Int. Cl.² B01D *39/20*; B29C *27/04*

U.S. Cl. 156—272 **4 Claims**

1. A method of making a filter device for medical infusion and injection equipment and the like, comprising the steps of: inserting an at least partially metallic porous filter element into an open area defined by a peripheral portion of the interior peripheral wall of an at least partially plastic peripheral member so that the outer periphery of the filter engages and contacts said peripheral portion of said interior peripheral wall along a continuous peripheral ring; and heating said filter element to a temperature sufficient to cause said peripheral portion of the interior peripheral wall of said peripheral mem-

ber to flow into the pores of said filter element and thereby create a seal between the filter element and the interior pe-



ripheral wall along a continuous peripheral ring said filter element comprising a sintered, powdered, metal filter body.

3,976,530

METHOD FOR PRODUCING A TWO COMPONENT POLYMERIC TAPE

John E. Callan, Trenton, N.J., assignor to Cities Service Company, Tulsa, Okla.

Continuation of Ser. No. 193,990, Oct. 29, 1971, Pat. No. 3,900,999. This application May 12, 1975, Ser. No. 576,824

The portion of the term of this patent subsequent to Aug. 26, 1992, has been disclaimed.

Int. Cl.² C09J *5/00*; B29C *19/00*

U.S. Cl. 156—306 **1 Claim**

1. The method of producing a two-component polymeric tape which comprises:

a. incorporating a rubber vulcanizing agent into a polymer that is substantially non-crosslinkable by said agent,

b. forming the mixture of step (a) into an elongated piece, and

c. joining the elongated piece from step (b) to a piece of vulcanizable rubber that is curable by said vulcanizing agent, the union of the two pieces being along the lengths thereof.

3,976,531

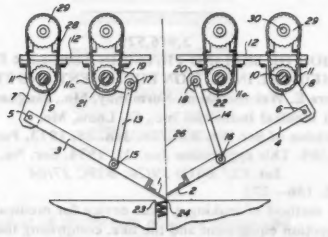
MACHINE AND METHOD OF OPERATION THEREOF FOR PRODUCING NON-WOVEN "GLUED" CARPETS

Edward George Dillinger, Levittown, Pa., assignor to Kemos, Incorporated, Marietta, Ga.

Filed Mar. 12, 1975, Ser. No. 557,747

Int. Cl.² B65H *25/00*

U.S. Cl. 156—361 **11 Claims**



1. In a machine for making bonded non-woven carpets comprising means for feeding two backing sheets toward one another and over the opposite edges of an entrance to a receiving passage extending widthwise of the sheets across the machine, means for feeding a fibrous sheet through the entrance into the passage, opposed presser blades extending widthwise of the machine, a mechanical linkage connected to each presser blade and having an arm secured to an oscillatable shaft for oscillation therewith, for advancing and withdrawing the blade in timed sequence to alternately press the fibrous sheet against one and then the other of the opposed backing sheets as they pass into the passage entrance, the improvement wherein the means for oscillating the shaft comprises electric motor means having a drive shaft rotatable in either direction in response to an electric signal or pulse, control means for generating and transmitting to the motor means (1) one or more electrical signals or pulses of predetermined polarity and duration to drive the motor shaft in one direction through a predetermined angle and (2) one or more electrical pulses of polarity opposite that of (1) to drive the motor shaft in the opposite direction through a predetermined angle, said control means having logic means for predetermining the sequence of the (1) pulse or pulses and of the (2) pulse or pulses, to oscillate the shaft and actuate the linkage associated therewith to advance and withdraw the respective presser blade in a predetermined manner.

3,976,532

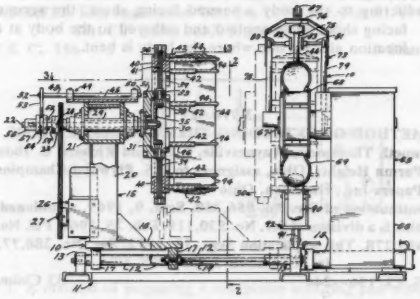
TREAD APPLYING MACHINE

Carlton K. Barefoot, Muncie, Ind., assignor to Tred-X Corporation, Muncie, Ind.

Filed Dec. 23, 1974, Ser. No. 535,158

Int. Cl.² B29H *17/37*

U.S. Cl. 156—405 **10 Claims**



1. A tread applying machine comprising, in combination, a base, a tread assembly mounted for movement on said base, said tread assembly including a head assembly mounted to rotate about an axis, said head assembly including means for retaining an endless tread, tire casing means for rotably mounting a prepared tire casing in opposed and axially aligned relationship with said head assembly for rotation about said axis, and roller means for joining a retained precured endless tread to a mounted prepared tire casing while such tread and casing are simultaneously rotated about said axis, whereby the precured endless tread can be initially tacked to such casing with pressure exerted by said roller means while such endless tread is retained on said head assembly.

3,976,533

APPARATUS FOR BONDING PAPER OR FOIL WEBS ON SUBSTRATES

Kürt Straüven, Bonn, Germany, assignor to Wasser-Sand-Forschungs-und Vertriebsgesellschaft mbH, Bonn, Germany

Filed July 17, 1974, Ser. No. 489,165

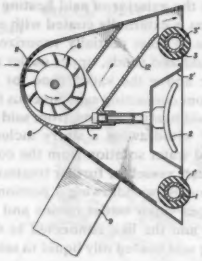
Claims priority, application Germany, July 23, 1973, 2337429

Int. Cl.² B32B *35/00*; C09J *7/00*

U.S. Cl. 156—497 **10 Claims**

1. An apparatus for adhesive bonding of paper or foil webs to a substrate, comprising:

a. a housing;
b. an elastic element mounted within said housing and extending substantially parallel to said web for smoothing the web on its substrate;
c. heating means mounted within said housing so as to supply heat to the web material, especially to the adhesive layer on the back side thereof; and
d. a further elastic element mounted within said housing and extending substantially parallel to said web for bonding the web on its substrate after the application of heat; and



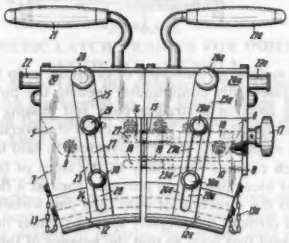
e. cooling means mounted within said housing for cooling the activated adhesive layer, wherein the housing has an open end which serves as an access opening for the application of heat and cooling to the web and for the engagement of both elastic elements to the web, and wherein both the heating means and the cooling means include shielding structure to insure that the heating medium and the cooling medium do not interfere during operation of the apparatus.

3,976,534

DEVICE FOR USE IN UNITING THE ADJACENT ENDS OF RADIALLY SPLIT SEALING RINGS

Gerhard H. W. Walter, and Gunter E. W. Pietsch, both of Hamburg, Germany, assignors to Howaldtswerke-Deutsche Werft Aktiengesellschaft Hamburg und Kiel, Hamburg, Germany

Filed July 22, 1974, Ser. No. 490,748
Claims priority, application Germany, July 28, 1973, 2338373
Int. Cl.² B29H *15/04*; B30B *15/34*
U.S. Cl. 156—507 **11 Claims**



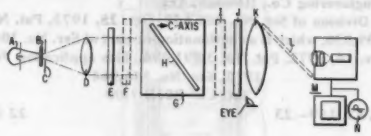
1. An apparatus for homogeneously uniting the ends of a sealing ring split radially on one side and provided with adhesive comprising two body members, each member defining a guide slot therein and a profile of a portion of the sealing ring to be united, two segments coacting with said members each of which defines a guide slot therein and the remaining portions of the profile of the sealing ring to be united, each body member and segment when assembled defining an aperture shaped to the contour of the sealing ring, means on each of said body members for effecting relative movement between said body members towards and away from each other in a direction tangential to said ring in said apertures to clamp said ring with its adhesive coated ends pressed together to effect a homogeneous joint between them, and two slide bars each of which is slidable within a said guide slot in a body member and cooperating segment when said member and segment are aligned for securing said segments to said members.

3,976,535

SCREENING SEEDS FOR QUARTZ GROWTH

Robert Leroy Barns, Berkeley Heights, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 27, 1975, Ser. No. 580,782
Int. Cl.² B01J *17/04*; C01B *33/12*
U.S. Cl. 156—601 **4 Claims**



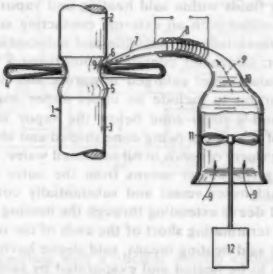
1. In a method for hydrothermal growth of quartz crystals in which growth of quartz occurs on a quartz crystal seed plate immersed in a hydrothermal solution containing nutrient quartz and maintained under temperature and pressure such that the nutrient quartz dissolves and recrystallizes on the seed plate the improvement characterized in that the internal strain of the seed plate is first examined by exposing the surface of the seed plate to visible polarized light that is monochromatic within ± 200 A within a beam that is collimated to ± 2° and is directed ± 2° along the optic axis of the seed plate, then determining the approximate r value of the seed plate, r, being 0.001 waves of light retardation, and selecting those seed plates for use having an r value of 20 or less.

3,976,536

METHOD FOR PRODUCING A CONTROLLED RADIAL PATH OF RESISTANCE IN A SEMICONDUCTOR MONOCRYSTALLINE ROD

Wolfgang Keller, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin, Germany

Filed Apr. 12, 1974, Ser. No. 460,539
Claims priority, application Germany, Apr. 18, 1973, 2319700
Int. Cl.² H01L *7/42*
U.S. Cl. 156—620 **7 Claims**



1. In a method of controlling the radial path of resistance in a semiconductor rod composed of silicon during a crucible-free zone melt processing of a previously doped semiconductor rod supported vertically at the ends thereof and having a

seed crystal attached to one end thereof with an inductive heating means encompassing an axial portion of such rod at the juncture of the seed crystal and the rod to generate a melt zone which is moved in a stream of protective gas away from such juncture along the axial direction of the rod, the improvement comprising:

wherein said melt zone is generated by a single-turn flat coil having a coil slot between the coil terminals thereof sealed with an inert material whereby disturbances in the flow of said protective gas stream at the region of said melt zone are avoided and a substantially uniform path of resistance is produced across a cross-section of a so-treated rod.

3,976,537

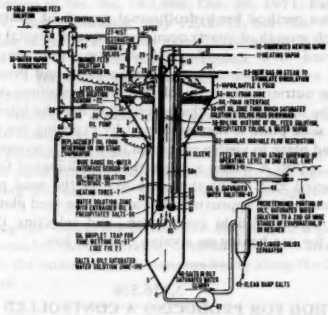
HEAT EXCHANGERS AND EVAPORATORS

Ransome W. Erwin, Holtville, Calif., assignor to Austral-Erwin Engineering Co., Houston, Tex.

Division of Ser. No. 409,659, Oct. 25, 1973, Pat. No. 3,939,036, which is a continuation-in-part of Ser. No. 306,183, Nov. 14, 1972, Pat. No. 3,891,496. This application Feb. 4, 1975, Ser. No. 546,944

Int. Cl.[2] B01D *1/00*

U.S. Cl. 159—23 **22 Claims**



22. An apparatus for evaporating aqueous solutions containing solids and/or mineral salts without substantial adherence of such solids to surfaces contacted by the aqueous solution, wherein all contacting surfaces are preferentially oil wettable and coated with an oily liquid and all heated surfaces are also substantially zero water adsorbent, and comprise fluorocarbon resins or polymers; said apparatus comprising an outer container enclosing a confined heating and vaporizing zone, heating means therein arranged to be externally contacted by fluids within said heating and vaporizing zone and being provided with an external contacting surface which is both preferentially oil wettable and substantially zero water adsorbent; said outer container comprising a fluid tight, upright tubular vessel enlarged upwardly and outwardly at its upper portion to include an upper vapor zone with baffles therein and a foam zone below the vapor zone, the lower portion of said vessel being cone shaped and terminating in an outlet for slurry of solids in oil saturated water; an inner sleeve separating the heater means from the outer vessel, located within said outer vessel and substantially concentric therewith, said sleeve extending through the heating and vaporizing zone but terminating short of the ends of the outer vessel and enclosing said heating means, said sleeve having a lower inlet for fluids to be heated and evaporated by said heater and an upper outlet for the heat treated fluids including vapors and residual liquids and solids, said outlet opening into said vapor zone, upper perforated downwardly and outwardly sloping baffle means within said vapor zone at the outlet end of said sleeve, to receive the unvaporized fluid comprising liquid containing solids from said outlet and to remove residual vapors therefrom and lower downwardly and inwardly sloping baffle means cooperating with said upper baffle means arranged to receive the unvaporized product from said upper baffle means; and deliver it to the foam zone; a source of cold aqueous feed solution containing solids and/or dissolved mineral salts, a feed line from said source of aqueous solution to a position within said outer container adjacent to the inlet of said sleeve, means for supplying a heated oily liquid to said aqueous feed line, prior to their entry into said container to preheat the said solution, means for effecting flow of said aqueous feed solution and oily liquid through said sleeve and into contact with the exterior of said heating means, whereby said heating means is externally coated with oil and said aqueous feed liquid is at least partially vaporized and separated from the oily liquid and solids, upper outlet means in the top of said container above the vapor zone for withdrawing hot vapor, derived from contacting said aqueous feed solution and oily liquid with said heating means, from said container, lower outlet means for withdrawing a slurry including solids, salts and oily saturated water solution from the cone shaped lower portion of said outer vessel for further treatment, and intermediate outlet means for withdrawing a portion of the oil intermediate said upper vapor outlet means and the lower outlet means for slurry and the like connected to the aqueous feed line for supplying said heated oily liquid to said aqueous feed.

3,976,538

METHOD FOR BLEACHING OF CELLULOSIC PULP

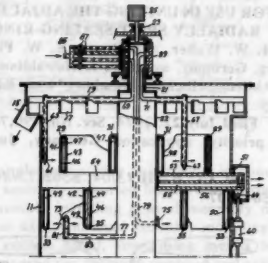
Johan E. Gullichsen, Helsingfors, Finland, and Rolf G. Ekholm, Karlstad, Sweden, assignors to Kamyr Aktiebolag, Karlstad, Sweden

Continuation of Ser. No. 457,348, April 2, 1974, abandoned, which is a division of Ser. No. 222,230, Jan. 31, 1972, Pat. No. 3,815,386. This application Feb. 24, 1976, Ser. No. 660,788

Claims priority, application Sweden, Feb. 2, 1971, 1246/71

Int. Cl.[2] D21C *9/10*

U.S. Cl. 162—17 **4 Claims**



1. In a method of bleaching of cellulosic pulp including the steps of essentially continuously feeding the pulp through a bleaching zone in a straight path and passing a bleaching liquid through the pulp in a direction transverse to the feed direction of the pulp, the improvement in said liquid passing step which consists essentially of the steps of feeding a first portion of bleaching liquid into said zone at a first level with respect to the direction of pulp feed and withdrawing liquid displaced through transversely spaced strainer means located at about said first level so that the passage of the first portion of bleaching liquid through all parts of the pulp flowing along said straight path within said zone through said first level is in a direction transverse to the feed direction of the pulp and feeding a second portion of bleaching liquid into said zone at a second level with respect to the direction of pulp feed and withdrawing liquid displaced through transversely spaced strainer means located at about the second level so that the passage of the second portion of bleaching liquid through all parts of said pulp flowing along said straight path within said zone through said second level is in a direction transverse to

the feed direction of the pulp and opposite from the transverse direction through said first level.

3,976,539

ADJUSTABLE SLICE FOR THE HEADBOX OR THE LIKE OF A PAPER OR EQUIVALENT MACHINE

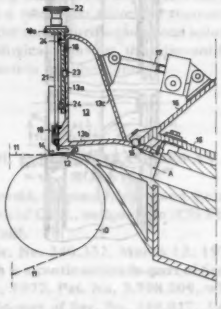
Alvi Kirjavainen, Jyvaskyla, Finland, assignor to Valmet Oy, Helsinki, Finland

Filed Aug. 18, 1975, Ser. No. 605,444

Claims priority, application Finland, Aug. 20, 1974, 2459/74

Int. Cl.² D21F 1/02

U.S. Cl. 162—344 **8 Claims**



1. For use at a slice region of a headbox or the like of a paper or equivalent machine, a front support structure having an elongated substantially horizontal lower region situated adjacent an upper lip of the slice, an elongated strip extending along said lower region of said front support structure and projecting downwardly beyond said lower region where said strip terminates in an elongated substantially horizontal free edge defining the upper lip of the slice, an elongated plate situated in front of and adjacent said front support structure and extending horizontally across the latter throughout the entire width of the slice, said plate carrying an adjusting means which is operatively connected with said strip for adjusting the latter, and a pair of suport means carried by said front support structure, respectively situated substantially at Besselian points of said plate, and supporting the latter whle transmitting substantially all reaction forces substantially parallel to said front support structure between said front support structure and said plate.

3,976,540

MAGNETIC LATCH TRIGGER FOR INHERENT SHUTDOWN ASSEMBLY

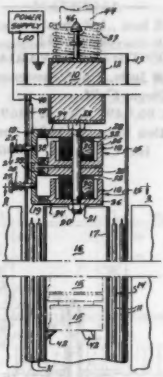
Edmund S. Sowa, Lisle, Ill., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Apr. 3, 1975, Ser. No. 564,926

Int. Cl.² G21C 7/08

U.S. Cl. 176—36 R **6 Claims**

1. In a nuclear reactor, an inherent shutdown assembly for releasing a neutron absorber into the core region of the reactor with the density of neutron flux of the core region at a critical level, comprising: support means adjacent the core region capable of supporting an object coupled thereto, a neutron absorber, a fissionable material exposed to the neutron flux of the core region so that as the density of said flux varies the temperature of said fissionable material varies proportionally, and a magnetic latch including a magnet and a ferromagnetic link in contact with said fissionable material so that the temperature of said link varies proportionally with the temperature of said fissionable material and thereby with the density of said flux, said latch being coupled to said support means and said absorber so that with the density of neutron flux below the critical level said link is attracted to said magnet to form a completed magnetic circuit of sufficient attractive force between said link and said magnet to couple the absorber to said support means whereby the absorber is held



in a position adjacent the core region, and so that with the density of neutron flux at least equal to the critical level the magnetic permeability of said link being of such value that the attractive force between said link and said magnet is insufficient to couple said absorber to said support thereby allowing said absorber to enter said core region.

3,976,541

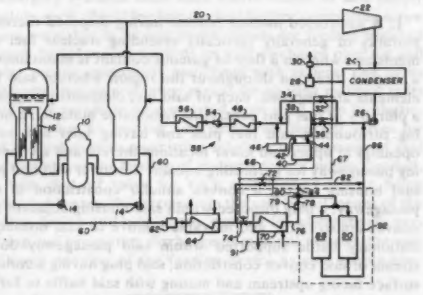
SECONDARY COOLANT PURIFICATION SYSTEM WITH DEMINERALIZER BYPASS

Fred Zwald Stiteler, New Hartford, and James Phillip Donohue, Rockville, both of Conn., assignors to Combustion Engineering, Inc., Windsor, Conn.

Filed Mar. 18, 1974, Ser. No. 452,225

Int. Cl.² G21C 19/32

U.S. Cl. 176—37 **13 Claims**



1. In combination with a nuclear reactor cooled by a primary coolant which is circulated in an out-of-contact heat exchange relationship with a secondary coolant in a steam generator having primary and secondary sides and in combination with a secondary coolant system including said steam generator, a turbine, a condenser, and a condensate pump, the improvement comprising:

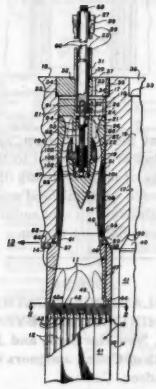
a. a condensate demineralizer downstream of said condenser for demineralizing said secondary coolant;
b. a bypass line straddling said condensate demineralizer; and
c. means in said secondary coolant system for diverting a portion of said secondary coolant around said condensate demineralizer.

3,976,542

FUEL ELEMENT HAVING VARIABLE ORIFICE

Peter Fortescue, La Jolla, Calif., assignor to General Atomic Company, San Diego, Calif.

Division of Ser. No. 863,497, Oct. 3, 1969, Pat. No. 3,743,576. This application May 25, 1973, Ser. No. 364,083
Int. Cl.[2] G21C *15/00*
U.S. Cl. 176—43 7 Claims



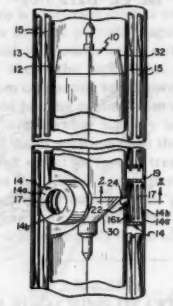
1. A gas-cooled nuclear reactor having disposed therein a plurality of generally vertically extending nuclear fuel elements and wherein a flow of gaseous coolant is maintained in a vertical direction throughout the region wherein said fuel elements are disposed, each of said fuel elements comprising a plurality of fuel pins containing fissionable material, a housing surrounding said fuel pins and having inlet and outlet openings at upper and lower locations therein and a connecting passageway for permitting coolant flow over said fuel pins, said housing having a convex annular constriction in said passageway, a plug disposed within said housing adjacent said convex constriction, and movable relative to said housing, a stationary baffle supported within said passageway downstream of said convex constriction, said plug having a concave surface facing upstream and mating with said baffle to form a streamlined composite of inverted teardrop shape with respect to the direction of coolant flow, said plug and said convex annular constriction forming a generally annular orifice through which the gaseous coolant flows, the size of which orifice is variable in accordance with the vertical position of said plug, and means for moving said plug vertically within said housing between a fully open position wherein it mates with said baffle and a closed position wherein said plug resides in its closest proximity to said convex constriction.

3,976,543

TEMPERATURE ACTUATED SHUTDOWN ASSEMBLY FOR A NUCLEAR REACTOR

Edmund S. Sowa, Lisle, Ill., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Nov. 14, 1975, Ser. No. 631,969
Int. Cl.[2] G21C *7/02*
U.S. Cl. 176—86 R 7 Claims



1. A temperature actuated shutdown assembly for a nuclear reactor comprising a neutron absorber, a tube disposed around said absorber and coaxial with the longitudinal axis of the absorber, said tube having a plurality of ports therein spaced around its circumference, a flange welded to the tube concentrically over each port, a bimetallic disk retained movably within each flange in the shape of a spherical cap with its inner, normally convex side composed of a layer of metal and its outer, normally concave side composed of a layer of a different metal of a higher coefficient of thermal expansion, a metal ball retained in the center of the inner layer of each disk by a retainer with the center of said metal ball aligned concentrically with and projecting partially through the port in the side of the tube thereby supporting said absorber, said metal ball being biased inwardly toward said absorber, whereby upon reaching a preset temperature, stresses will be created within at least one of the bimetallic disks; the imbalanced thermal stresses will cause at least one disk to reverse concave and convex sides thus removing the ball from the hole in the wall of the tube allowing the absorber to drop into the reactor core.

3,976,544

WATER-SOLUBLE IMMUNOLOGICAL ADJUVANTS, IN PARTICULAR FOR VACCINES, OBTAINED FROM MYCOBACTERIA AND RELATED MICROORGANISMS AND PROCESS FOR THEIR EXTRACTION

Arlette Adam, Palaiseau, France; Frank Berger, Princeton, N.J.; Louis Chedid, Paris, France; Edgar Lederer, Sceaux, France; Jean-Francois Petit, Paris, France; and Rita Ciorbaru, Montrouge, France; assignors to The Agence Nationale de Valorisation de le Recherche, Paris, France

Filed June 19, 1973, Ser. No. 371,512
Int. Cl.[2] A61K *27/00*; C12D *13/02*
U.S. Cl. 195—2 14 Claims

1. In the process for preparing a water-soluble immunological non-specific adjuvant which comprises

treating an aqueous suspension of solvent-extracted delipidated whole cells of pathogenic and non-pathogenic Mycobacteria or Nocardia micro-organisms with a muramidase to free the immunological non-specific adjuvant,

separating the solid fraction from the mixture,

recovering the aqueous portion containing amino-acids other than those of the peptidoglycan and the immunological non-specific adjuvant, the adjuvant having reduced sensitizing action to tuberculine.

14. In the process for preparing a water-soluble immunological non-specific adjuvant which comprises

treating an aqueous suspension of solvent-extracted delipidated whole cells of pathogenic and non-pathogenic Mycobacteria or Nocardia micro-organisms with a muramidase to free the immunological non-specific adjuvant,

separating the solid fraction from the mixture,

incubating the aqueous medium of the immunological adjuvant with a proteolytic enzyme, thereby removing amino acids, filtering the aqueous solution of the immunological adjuvant on a molecular sieve and recovering the filtrate containing the more purified aqueous solution containing the immunological adjuvant, the adjuvant having reduced sensitizing action to tuberculine.

3,976,545

1,2,4-TRIAZOL E-3-CARBOXAMIDES AS ANTIVIRAL AGENTS

Joseph T. Witkowski, Laguna Niguel, and Roland K. Robins, Santa Ana, both of Calif., assignors to ICN Pharmaceuticals, Inc., Irvine, Calif.

Division of Ser. No. 340,332, March 12, 1973, Pat. No. 3,927,216, which is a continuation-in-part of Ser. No. 240,252, March 31, 1972, Pat. No. 3,798,209, which is a continuation-in-part of Ser. No. 149,017, June 1, 1971, abandoned. This application Sept. 29, 1975, Ser. No. 617,432

Int. Cl.² C12D *13/06*

U.S. Cl. 195—28 N 5 Claims

1. A process of preparing 1-β-D-ribofuranosyl-1,2,4-triazole-3-carboxamide in which 1,2,4-triazole-3-carboxamide is reacted with the enzyme nucleoside phosphorylase in the presence of ribose-1-phosphate at a pH of from about 5 to about 9 and a temperature of from about 0° to about 50°C.

3,976,546

CEPHALOSPORINS

Alan Smith, Ulverston, and Ronald W. Larner, Swarthmoor, near Ulverston, both of England, assignors to Glaxo Laboratories Limited, Greenford, England

Filed Nov. 3, 1975, Ser. No. 628,057

Int. Cl.² C12D *9/00*

U.S. Cl. 195—29 13 Claims

1. In a process for the enzymically catalysed hydrolysis of a 3-acyloxymethylceph-3-em-4-carboxylic acid to a 3-hydroxymethyl analogue thereof, the improvement which comprises contacting said 3-acyloxymethylceph-3-em-4-carboxylic acid with an esterase produced by culturing a microorganism of the class Basidiomycetes.

3,976,547

CELL AND VACCINE PRODUCTION

William J. McAleer, Ambler, Pa.; Raymond E. Spier, Guildford, England, and Abner J. Schlabach, Perkasie, Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 219,945, Jan. 24, 1972, abandoned. This application Nov. 19, 1974, Ser. No. 525,270

Int. Cl.² C12K *9/00*

U.S. Cl. 195—127 8 Claims

1. In an in vitro cell culture container apparatus wherein cells are grown on solid metallic cell growth surfaces of said apparatus, the improvement comprising solid metallic cell growth surfaces having controlled surface topography such that the surface has irregularities which are greater than the diameter of the cells.

3,976,548

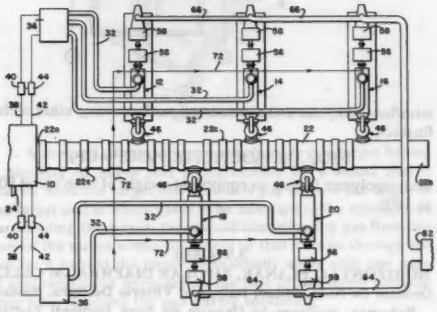
APPARATUS FOR PROCESSING COAL AND LIKE MATERIAL

Victor Kevorkian, Belle Mead, N.J., and Francis J. Cumings, Windham, N.H., assignors to Ingersoll-Rand Research Inc., Princeton, N.J.

Filed Dec. 3, 1974, Ser. No. 529,037

Int. Cl.² C10B *13/00, 31/10*

U.S. Cl. 202—118 4 Claims



1. Apparatus for processing coal and like material, comprising pressurized receiver means for the material, a material supply conduit connected to said receiver means for supplying material thereto, a plurality of material feeding devices connected to said material supply conduit to permit their selective employment for feeding material to said supply conduit, each of said feeding devices comprising barrel means adapted to communicate with material source means to receive material in solid form therefrom and having a discharge opening for discharging material from such barrel means to said supply conduit, each of said feeding devices further comprising screw means rotatably in its said barrel means for feeding material in such barrel means towards its said discharge opening and heater means operatively associated with at least one of its said barrel means and screw means for causing material in its said barrel means to be converted from solid form to plastic-like condition by heating, and individual shut-off valves for said feeding devices permitting selective employment of said feeding devices for feeding of material to said supply conduit, the said shut-off valve for each said feeding device being associated therewith intermediate the said barrel means of the feeding device and said supply conduit for alternatively permitting and preventing discharge of material through the said discharge opening of the feeding device to said supply conduit.

3,976,549

ELECTROLYSIS METHOD

Ralph Falvo, Niagara Falls, N.Y., assignor to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

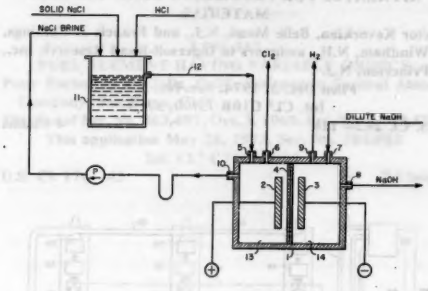
Filed Feb. 26, 1973, Ser. No. 335,975

Int. Cl.² C25B *1/16, 1/26, 13/08*

U.S. Cl. 204—1 R 25 Claims

1. A process for the electrolytic decomposition of aqueous solutions of ionizable chemical compounds which comprises

electrolyzing an aqueous solution of an ionizable chemical compound in an electrolytic cell having an anode compartment and a cathode compartment separated by a unitary barrier having at least two layers of a permselective membrane material which is impervious to liquids and gases and is a copolymer of



tetrafluoroethylene and a sulfonated perfluorovinyl ether of the formula

$$FSO_2CF_2CF_2OCF(CF_3)CF_2OCF=CF_2$$

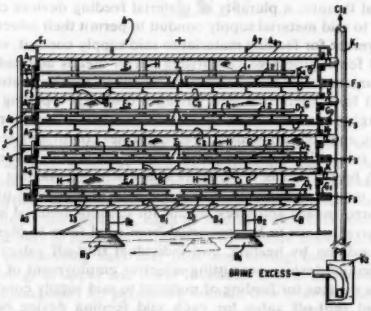
said copolymer having an equivalent weight of from about 900 to 1600.

3,976,550

HORIZONTAL, PLANAR, BIPOLAR DIAPHRAGM CELLS

Oronzio De Nora, Milan, Italy, and Vittorio De Nora, Nassau, Bahamas, assignors to Oronzio de Nora Impianti Elettrochimici S.p.A., Milan, Italy

Continuation of Ser. No. 227,148, Feb. 17, 1972, abandoned. This application May 15, 1974, Ser. No. 470,281
Claims priority, application Italy, Sept. 22, 1971, 28938/71
Int. Cl.² C25B *1/14, 1/26, 9/00, 9/02*
U.S. Cl. 204—98 **31 Claims**



1. In the electrolysis of aqueous alkali metal halide solution, the method which comprises conducting the electrolysis between an anode and a horizontally oriented electrolyte permeable cathode disposed below the anode with a diaphragm between anode and cathode, collecting evolved gaseous halogen in a gas space above the level of the aqueous alkali metal halide solution and removing the gaseous halogen separate from the halide solution and maintaining a differential pressure between said collected halogen and the area under the cathode to enhance downward flow of electrolyte through the cathode.

6. A horizontal bipolar diaphragm electrolysis cell having a plurality of horizontal cell units in bipolar connection with each other, each cell unit consisting of an anode compartment having an anolyte liquor chamber and a gas chamber therein and a cathode compartment having a catholyte liquor chamber and a gas chamber therein, a frame surrounding each anode compartment and each cathode compartment, means to insulate the frames surrounding said compartments from flow of electricity from the walls of the anode compartments and the walls of the cathode compartments, horizontal substantially planar open mesh valve metal anodes having an electrically conductive electrocatalytic coating thereon, in each anode compartment, a corrosion resistant lining in each anode compartment, a diaphragm, a metal cathode screen and a solid horizontal ferrous metal bottom plate in each cathode compartment, metal electrical connections between each anode and the ferrous metal bottom plate of the cathode compartment above, means to feed anolyte liquor into each of said anode compartments, means above the anolyte liquor feed means to remove anodic gas separate from the anolyte liquor from each anode compartment, means to remove catholyte liquor and cathodic gas separated from the catholyte liquor and metal conductor means to convey electric current to and from each of said cell units to electrolyze the anolyte liquor fed to said anode compartments.

3,976,551

METHOD FOR REDUCING THE SULFUR CONTENT OF A PETROLEUM FRACTION

Paul F. Warner, Phillips, Tex., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 150,815, June 7, 1971, Pat. No. 3,865,714. This application Nov. 11, 1974, Ser. No. 522,604
Int. Cl.² B01J *1/10*
U.S. Cl. 204—158 R **8 Claims**

1. A method for reducing the sulfur content of a petroleum fraction having a distillation end point below about 600°F. and containing mercaptans, comprising:

contacting the liquid petroleum fraction with at least one compound selected from the group consisting of a polymer of a conjugated diene, a copolymer of a conjugated diene, a copolymer of a conjugated diene with a vinyl aromatic compound, such as to form a resultant mixture, said polymer having at least about 30 double bonds per molecule;

subjecting said resultant mixture to an ultraviolet light wave or an irradiation from a fluorescent light source; and

separating the petroleum fraction from the polymer.

3,976,552

WATER-SOLUBLE GRAFT POLYMERS PRODUCED BY AN OUTWARDLY DRY RADIATION POLYMERIZATION PROCESS

George F. Fanta, and Robert C. Burr, both of Peoria, Ill., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Aug. 13, 1975, Ser. No. 604,362
Int. Cl.² C08L *1/00, 3/00*
U.S. Cl. 204—159.12 **2 Claims**

1. A method of preparing starch graft copolymers comprising the steps of:

a. preparing a concentrated aqueous solution containing from about 20 to 50 percent of a water-soluble monomer selected from the group consisting of acrylamide, N,N,N-trimethylaminoethyl methacrylate methyl sulfate, methacrylamide, acrylic acid, 2-hydroxy-3-methacryloyloxypropyltrimethylammonium chloride, or mixtures of the same;

adding starch to the solution resulting from step (a) in sufficient quantities to absorb all of said solution and to give a reaction mass having an outwardly dry or slightly damp appearance, said starch being present in an amount such that the ratio of starch to monomer on a dry weight basis is from 1:1 to 20:1;

c. purging the starch-monomer mixture resulting from step (b) with an inert gas; and

d. irradiating the purged mixture resulting from step (c) with gamma rays from cobalt-60 to a total dose of about 0.1 Mrad.

3,976,553

CURABLE POLYENE-POLYTHIOL COMPOUNDS AND METHODS FOR PREPARATION AND CURING

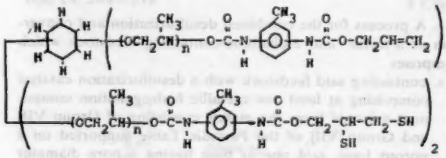
Donald W. Larsen, Marriottsville, Md., assignor to W. R. Grace & Co., Columbia, Md.

Division of Ser. No. 504,410, Sept. 9, 1974, Pat. No. 3,966,794, which is a continuation of Ser. No. 259,148, June 2, 1972, abandoned. This application Mar. 13, 1975, Ser. No. 558,041

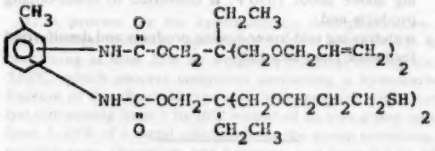
Int. Cl.² C08F 2/46, 4/00

U.S. Cl. 204—159.22 **4 Claims**

1. A method for forming a solid article comprising exposing a compound having the formula:



wherein *n* is a numeral from 1 to 2, with *n* being, on the average, about 1.5 per molecule or



to a free radical generator.

3,976,554

METHOD OF FORMING BETA-ALUMINA ARTICLES

Robert W. Powers, Schenectady; Stephan P. Mitoff, Elnora, and Edward Szymalak, Schenectady, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 31, 1975, Ser. No. 645,549

Int. Cl.² C25D 1/14, 1/20

U.S. Cl. 204—181 **4 Claims**

1. A method of forming a beta-alumina article which comprises providing a suspension consisting of beta-alumina particles the majority of which have a size in the range of from 0.5 to 2 microns in an organic fluid having a dielectric constant at 25°C of from 12 to 24, electrophoretically depositing the beta-alumina particles from the suspension as a dense deposit onto a charged electrode in a DC electric field of from 100 to 10,000 volts per centimeter, drying the deposit on the mandrel in a continuous flow of warm air, removing the deposit from the electrode, and sintering the deposit in an oxygen oxidizing atmosphere at a temperature between 1575° and 1825°C resulting in a dense, sintered beta-alumina article.

3,976,555

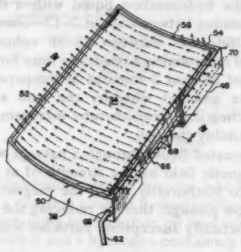
METHOD AND APPARATUS FOR SUPPLYING BACKGROUND GAS IN A SPUTTERING CHAMBER

Herbert Von Hartel, Lexington, Mass., assignor to Coulter Information Systems, Inc., Bedford, Mass.

Filed Mar. 20, 1975, Ser. No. 560,352

Int. Cl.² C23C 15/00

U.S. Cl. 204—192 **17 Claims**



1. A method of sputtering in which there is a target having a plurality of edges that is surrounded by a shield that is spaced from the target and defines a gap around the edges of the target and in which gas is to be admitted to the atmosphere surrounding the target, the step of admitting the gas from the rear of the target within the shield so that it flows through the gap from behind the target substantially along only one edge of said target and impinges on the face of the target immediately after it leaves the gap during sputtering.

3,976,556

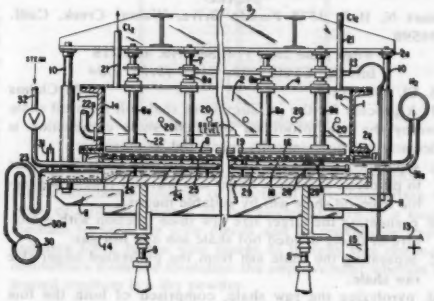
ELECTROLYSIS CELL

Vittorio De Nora, Nassau, Bahamas, assignor to Oronzio de Nora Impianti Elettrochimici S.p.A., Milan, Italy

Filed Dec. 5, 1974, Ser. No. 530,012

Int. Cl.² C25B 9/00

U.S. Cl. 204—262 **16 Claims**



1. An electrolysis cell having an anode compartment, a cathode compartment, an anolyte in the anode compartment, a catholyte in the cathode compartment, a diaphragm separating said compartments, dimensionally stable metal screen anodes and metal screen cathodes in said compartments, means to pass an electrolysis current between said anodes and cathodes, means to produce steam in the cathode compartment and means to circulate anolyte through the anode compartment to maintain the anolyte below the condensation point of steam to condense steam on the cathode side of said diaphragms to remove the caustic film from the cathode side of the diaphragms.

3,976,557

PRETREATMENT OF COAL-DERIVED LIQUID TO IMPROVE MAGNETIC SEPARATION OF SOLIDS

John Shen, Yardley, Pa., and Michael C. Chervenak, Pennington, N.J., assignors to Hydrocarbon Research, Inc., Morristown, N.J.

Filed Nov. 29, 1974, Ser. No. 527,943
Int. Cl.[2] C10G *1/06, 34/00*
U.S. Cl. 208—10 28 Claims

1. A process for magnetic separation of sulfur-containing solids from a hydrocarbon liquid derived from coal containing at least about 0.2 wt. percent pyritic sulfur which comprises:

a. contacting the hydrocarbon liquid with a treating gas mixture containing between about 2–15 volume percent, hydrogen sulfide and between 85–98 volume percent hydrogen and maintaining a residence time for the liquid-gas contact of at least 2 minutes at temperatures sufficiently above ambient whereby the iron sulfides are changed in chemical form, thereby increasing the magnetic susceptibility thereof;

b. passing the treated liquid through a passage way located within a magnetic field having strength of at least about 3000 gauss to temporarily retain the magnetic particles within the flow passage, thereby reducing the concentration of magnetically susceptible particles within the liquids;

c. withdrawing a liquid stream containing reduced solids concentration from the magnetic field;

d. demagnetizing the flow passage of the magnetic separator;

e. removing the retained sulfur-containing magnetic solid particles from the flow passages of the magnetic separator.

3,976,558

METHOD AND APPARATUS FOR PYROLYZING OIL SHALE

Robert N. Hall, 3578 Perada Drive, Walnut Creek, Calif. 94598

Filed June 26, 1974, Ser. No. 483,218
Int. Cl.[2] C10G *1/02;* C10B *49/16, 1/04*
U.S. Cl. 208—11 R 21 Claims

1. A process for the production of shale oil from oil shale whereby the heat produced by spent shale combustion is efficiently and economically recovered, comprising:

a. separating a fines fraction from the raw shale feed prior to pyrolysis to leave a larger size fraction readily separable from oil shale ash by suitable means;

b. preheating the larger size raw shale fraction with a mixture of finely divided hot shale ash and hot gas;

c. separating the shale ash from the preheated larger size raw shale;

d. pyrolyzing the raw shale, comprised of both the fine fraction and the larger size fraction in a fluid bed using a finely divided heat carrier, such as catalytic cracking catalyst;

e. controlling fluidization and heat transfer in the pyrolysis zone by the introduction of supplemental fluidizing vapor;

f. separating the heat carrier and small spent shale particles from the larger spent shale particles and feeding the heat carrier and small spent shale particles to a spent shale fluid bed combustion chamber;

g. separately pulverizing the larger spent shale particles and feeding same to a spent shale combustion chamber; and,

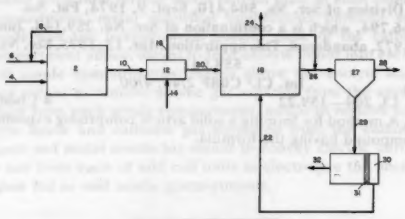
h. recirculating the heat carrier to the pyrolysis fluid bed.

3,976,559

COMBINED CATALYTIC AND ALKALI METAL HYDRODESULFURIZATION AND CONVERSION PROCESS

Roby Bearden, Jr., and Glen Porter Hamner, both of Baton Rouge, La., assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed Apr. 28, 1975, Ser. No. 571,918
Int. Cl.[2] C10G *23/02*
U.S. Cl. 208—89 19 Claims



1. A process for the combined desulfurization and conversion of a sulfur- and asphaltene-containing feedstock which comprises

a. contacting said feedstock with a desulfurization catalyst comprising at least one metallic hydrogenation component selected from the metals consisting of Group VIB and Group VIII of the Periodic Table supported on a porous base, said porous base having a pore diameter ranging from between about 10 to 100 Angstroms, under hydrodesulfurization conditions, so that said feedstock is at least partially desulfurized, and further so that hydrogen sulfide is generated therein; and

b. contacting said at least partially desulfurized feedstock from step (a) with an alkali metal in a conversion zone, at elevated temperatures, and in the presence of added hydrogen, so that at least 50 percent of the sulfur content of said feedstock is removed therefrom, and further so that at least about 50 percent of the heavy bottoms fraction of said at least partially desulfurized feedstock, boiling above about 1050°F, is converted to lower-boiling products and

c. withdrawing said lower-boiling products and desulfurized feedstock from step (b).

3,976,560

HYDROCARBON CONVERSION PROCESS

Henry Erickson, deceased, late of Park Forest, Ill., and by Doris Erickson, executor, Richton Park, Ill., assignors to Atlantic Richfield Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 352,809, April 19, 1973, Pat. No. 3,867,314. This application Feb. 13, 1975, Ser. No. 549,590
Int. Cl.[2] C10G *35/08, 13/10;* C07C *5/24*
U.S. Cl. 208—138 10 Claims

1. In a process for catalytically converting at least a portion of a hydrocarbon feed which comprises contacting said hydrocarbon feed at hydrocarbon conversion conditions with a catalyst comprising an iridium supported alumina catalyst, the improvement which comprises preparing the iridium supported alumina catalyst by the process which comprises impregnating an alumina-containing support with a liquid medium containing a soluble iridium compound, maintaining the

pH of the liquid medium during impregnation of the support in the range of from 3 to 6 with a base selected from ammonium hydroxide, a lower alkyl amine and mixtures thereof to yield an iridium alumina composite comprising from about 0.01 to about 1 weight % of iridium and subjecting the resulting iridium composition to drying, calcination and reduction.

3,976,561

DESULPHURIZATION CATALYSTS AND THEIR USE

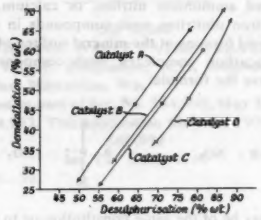
Martin Keith Eyles, Addlestone, England, assignor to The British Petroleum Company Limited, London, England

Filed Mar. 7, 1975, Ser. No. 556,306

Claims priority, application United Kingdom, Mar. 25, 1974, 13053/74

Int. Cl.² C10G *23/02*

U.S. Cl. 208—216 **2 Claims**



1. A process for the hydrocatalytic desulphurisation of hydrocarbon fractions containing sulphur compounds and containing at least 25% by weight of material boiling above 550°C. which process comprises contacting a hydrocarbon fraction of the aforesaid type with hydrogen and with a catalyst comprising from 1 to 10% weight of an iron group metal, from 5–25% of a metal selected from the group consisting of molybdenum, chromium and tungsten, and from 0.1 to 10% weight of an alkaline earth metal on a carrier selected from the group consisting of silica, alumina and silica-alumina, all weights being be weight of total catalyst, contacting being carried out at a temperature in the range 150° to 600°C., a pressure in the range 10 to 500 bars gauge, a liquid hourly space velocity in the range 0.1 to 10 and a hydrogen gas flow rate in the range from 100 to 3600 m^3/m^3.

2. A process for the hydrocatalytic desulphurisation of hydrocarbon fractions containing sulphur compounds and containing at least 25% by weight of material boiling above 550°C. which process comprises contacting a hydrocarbon fraction of the aforesaid type with hydrogen and with a catalyst comprising from 1 to 10% weight of an iron group metal, from 5–25% of a metal selected from the group consisting of molybdenum, chromium and tungsten, and from 0.1 to 10% weight of magnesium on a carrier selected from the group consisting of silica, alumina and silica-alumina, all weights being by weight of total catalyst, contacting being carried out at a temperature in the range 150° to 600°C., a pressure in the range 10 to 500 bars gauge, a liquid hourly space velocity in the range 0.1 to 10 and a hydrogen gas flow rate in the range from 100 to 3600 m^3/m^3.

3,976,562

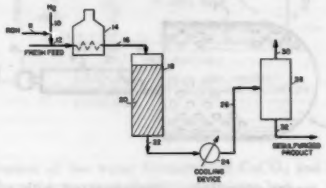
HYDRODESULFURIZATION WITH ALCOHOL ADDITION

Paul E. Eberly, Jr., Baton Rouge, La., assignor to Exxon Research and Engineering Company, Linden, N.J.

Filed June 17, 1975, Ser. No. 587,540

Int. Cl.² C10G *23/02*

U.S. Cl. 208—216 **15 Claims**



1. A hydrodesulfurization process which comprises: contacting, in a reaction zone, at hydrodesulfurization conditions, a sulfur-containing hydrocarbon oil feed with a hydrodesulfurization catalyst and a hydrogen-containing treating gas which includes a C1 to C4 alcohol.

3,976,563

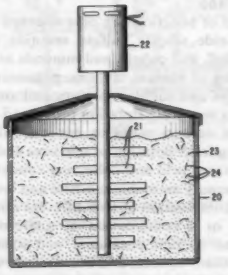
DRY RECLAMATION OF WIRE SCRAP

Emanuele Scalco, Bridgewater Township, Somerset County, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Mar. 7, 1975, Ser. No. 556,225

Int. Cl.² B03B *1/02*; B29C *29/00*; C22B *15/00*

U.S. Cl. 209—3 **9 Claims**



4. In a method for liberating metal conductors from the plastic insulation coating of electrical wire comprising the steps of agitating pieces of the electrical wire in a heated medium to heat the wire pieces and to provide an impact agitating force to the wire pieces to thereby free the metal conductors from the insulation the improvement wherein the heated medium is a dry powder.

3,976,564

COMBINATION DIGGER AND SIFTER FOR USE WITH METAL DETECTOR

Gradie R. Holder, 11 Buffalo, Clarkston, Mich. 48016

Filed Feb. 27, 1975, Ser. No. 553,554

Int. Cl.² B03C *1/30*

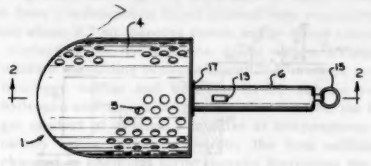
U.S. Cl. 209—38 **10 Claims**

1. An apparatus for locating and separating objects from a medium in which said objects are disposed, comprising, in combination:

first means for temporarily retaining therein at least a portion of said medium which may contain one or more of said objects to be located and separated from said medium;

said first means being provided with a plurality of apertures through which said portion of said medium may pass;

said apertures being dimensioned, located and shaped in said first means so as to facilitate and expedite the passage therethrough of said portion of said medium which is temporarily retained in said first means and substantially simultaneously to obstruct and impede the passage therethrough of at least some of said objects to be located and separated from said medium;



second means operatively interconnected with said first means to enable the entire apparatus to be readily held by one hand of a person utilizing said apparatus; and

third means disposed within said second means for facilitating and assisting the visual detection of objects remaining in said first means after substantially all of said portion of said medium has passed through said apertures provided in said first means.

3,976,565

FROTH FLOTATION METHOD FOR THE RECOVERY OF MINERALS BY MEANS OF QUATERNARY AMMONIUM NITRITES AND TERNARY PHOSPHINE DINITRITES

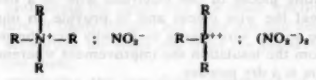
Vojislav Petrovich, 1925 W. Schiller St., Chicago, Ill. 60622

Filed June 2, 1975, Ser. No. 583,060

Int. Cl.² B03C *1/02*

U.S. Cl. 209—166 1 Claim

1. A method of beneficiating ores selected from the group consisting of oxide, silicate, sulfide, arsenide, and antimonide of copper, nickel, and cobalt, and minerals selected from the group consisting of lithium, sodium, potassium, and caesium silicates, halides and sulfates, barium and strontium sulfates and carbonates by a froth flotation process to produce a froth concentrate of desired metal or mineral value which comprises; effecting froth flotation of said ores and minerals in the presence of nitrous acid and collectors consisting of a combination of quaternary ammonium nitrite and ternary phosphine dinitrite, or a combination of two different quaternary ammonium nitrites, or a combination of quaternary ammonium nitrite and either sodium, potassium, and ammonia nitrites, or calcium, strontium, barium, and iron dinitrites, said collectors in conjunction with nitrous acid forming at the mineral surface of said metals mineral hydrocarbon undissociable complexes, both components of said complexes having the formula:



in which R may be of the same constitution or to be of different constitution, R is selected from the group consisting of alkyl alkanol, alkyldiol or alkyltriol, said R,s containing from 1–8 carbon atoms, the number of hydroxyl groups furnished by the combinations of said collectors, being 0 to 3 the number of said hydroxyl groups in said mineral hydrocarbon complexes being 1 to 3, the shorter chain R's of said quaternary ammonium nitrites and ternary phosphine dinitrites having zero hydroxyls, the larger chain R's of the quaternary ammonium nitrites and ternary phosphine dinitrites having 1–3 hydroxyl groups said complexes attaching to the bubbles provided by agitating the pulp of mineral slurry and recovering a froth concentrate relatively rich in the desired metal or mineral value, leaving tailing relatively poor in the desired metal or mineral value.

3,976,566

FROTH FLOTATION METHOD FOR THE RECOVERY OF MINERALS BY MEANS OF QUATERNARY PHOSPHONIUM NITRITES AND TERNARY PHOSPHINE DINITRITES

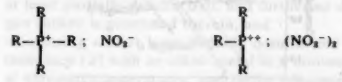
Vojislav Petrovich, 1925 W. Schiller St., Chicago, Ill. 60622

Filed Apr. 23, 1975, Ser. No. 570,568

Int. Cl.² B03D *1/02*

U.S. Cl. 209—166 11 Claims

1. A method of beneficiating ores selected from the group consisting of oxide, silicate, sulfide, aresenide, and antimonide of copper, nickel and cobalt, and minerals selected from the group consisting of lithium, sodium, potassium and caesium silicates, halides and sulfates, barium and strontium sulfates and carbonates by froth flotation process to produce a froth concentrate of desired metal or mineral value which comprises; effecting froth flotation of said ores and minerals in the presence of nitrous acid and collectors consisting of a combination of quaternary phosphonium nitrite and ternary phosphine dinitrite, or a combination of two different quaternary phosphonium nitrites, or a combination of two different phosphine dinitrites, or a combination of quaternary phosphonium nitrite and either sodium, potassium, and ammonium nitrites, or calcium, strontium, barium, and iron dinitrites, or a combination of ternary phosphine dinitrites and either sodium, potassium, and ammonium nitrites, or calcium, strontium, barium, and iron dinitrites, said compounds in conjunction with nitrous acid forming at the mineral surface of said metals mineral-hydrocarbon complexes; both components of said complexes have the formula:



in which R may be of the same constitution or to be of different constitution, R is selected from the group consisting of alkyl, or alkanol, alkyldiol or alkyltriol, said R's containing from 1–8 carbon atoms, the number of hydroxyl groups furnished by the combinations of said collectors being 0 to 3, the number of said hydroxyl groups in said mineral hydrocarbon complexes being 1 to 3, the shorter chain R's of said phosphonium nitrites and phosphine dinitrites having zero hydroxyl groups, the longer R's of said phosphonium nitrites and phosphine dinitrites having 1–3 hydroxyl groups, said complexes attaching to bubbles provided by agitating the pulp of mineral slurry; and recovering a froth concentrate relatively rich in the desired metal or mineral value, leaving tailings relatively poor in the desired metal or mineral value.

3,976,567

MATERIAL CONCENTRATOR

Robert C. MacElvain, and Ford M. MacElvain, both of 507 McClure Drive, Opelika, Ala. 36801

Filed Mar. 3, 1975, Ser. No. 555,259

Int. Cl.² B03B *5/08*

U.S. Cl. 209—430 9 Claims

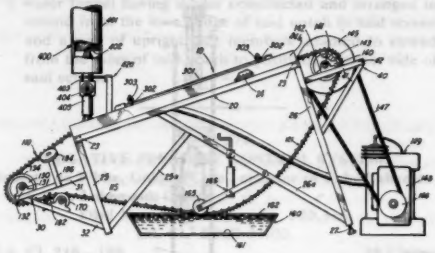
1. Process of concentrating the heavy constituents of an aggregate mixture, comprising:

a. passing a continuous flexible belt having upstanting spaced ribs transversely thereof in a closed path about spaced parallel, upper and lower transverse axes so that the upper flight of said belt moves upwardly along an incline;

b. flexing said upper flight so that the upper flight extends inwardly and downwardly toward its central portion as it moves upwardly along the incline;

c. depositing said aggregate mixture in a stream onto one edge portion of said upper flight and at a position where it begins its upward movement;

d. directing water laterally from above said one edge portion of said upper flight inwardly onto said upper flight for



contacting said aggregate mixture and for washing the lighter particles of said aggregate mixture down said inclined upper flight as the heavier particles thereof are carried by said belt over the upper axis and is then carried downwardly by the lower flight of said belt; and

e. removing said heavier particles from said lower flight.

3,976,568

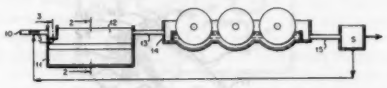
METHOD OF WASTEWATER TREATMENT

Wilbur N. Torpey, Douglaston, N.Y., assignor to Autotrol Corporation, Milwaukee, Wis.

Continuation-in-part of Ser. No. 364,509, May 29, 1973, Pat. No. 3,894,953. This application May 27, 1975, Ser. No. 580,971

Int. Cl.² C02C *1/16*

U.S. Cl. 210—16 **8 Claims**



1. A method of treating wastewater including settleable organic solids and solubilized carbonaceous pollutants comprising the steps of supplying said wastewater to a treatment tank having upper and lower zones, settling organic solids from said wastewater in said upper zone, accumulating settled solids in said lower zone, anerobically digesting settled organic solids in said lower zone, maintaining said wastewater in said upper zone for a predetermined detention time, said predetermined detention time being chosen to produce a wastewater effluent that is virtually free from dissolved or entrained hydrogen sulphide.

3,976,569

WATER SOFTENING PROCESS

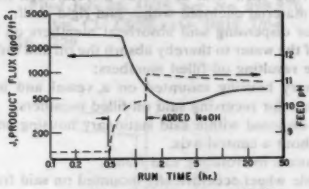
John D. Sheppard, and David G. Thomas, both of Oak Ridge, Tenn., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Feb. 25, 1975, Ser. No. 553,048

Int. Cl.³ B01D *13/00*

U.S. Cl. 210—23 F **4 Claims**

1. An improved process for softening hard water feed which comprises selectively precipitating $CaCO_3$ from said feed at a pH sufficient to deposit a permeable filtration layer consisting essentially of $CaCO_3$ on a porous substrate, while flowing said feed tangentially past said substrate increasing the pH of said feed to precipitate magnesium as magnesium hydroxide and then flowing the thus treated water tangentially past the deposited $CaCO_3$ at a velocity and pressure sufficient to effect



VARIATION IN FEED pH AND PRODUCT FLUX WITH RUN TIME DURING CROSSFLOW FILTRATION

transpiration of the water through said $CaCO_3$ and substrate to produce a transpired clarified water product.

3,976,570

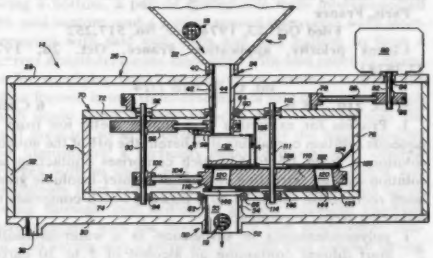
METHOD AND APPARATUS FOR REMOVING CONTAMINANTS FROM THE SURFACE OF A BODY OF WATER

Arthur W. McCray, 1110 Grove Lane, Norman, Okla. 73069

Continuation of Ser. No. 404,111, Oct. 5, 1973, abandoned. This application Apr. 18, 1975, Ser. No. 569,261

Int. Cl.² C02B *1/14*

U.S. Cl. 210—30 A **16 Claims**



6. A method of removing liquid hydrocarbon materials from the surface of a body of water comprising:

providing a plurality of hollow, substantially rigid, substantially spherical shell members each having a plurality of substantially circular holes formed therein;

positioning a quantity of oleophilic, hydrophobic material within each spherical shell member;

depositing the spherical shell members having the oleophilic, hydrophobic material contained therein on the surface of a body of water having liquid hydrocarbon materials floating thereon and thereby absorbing the liquid hydrocarbon materials in the oleophilic, hydrophobic material;

removing the spherical shell members having the oleophilic, hydrophobic material contained therein from the surface of the body of water;

subsequently guiding each spherical shell member having the oleophilic, hydrophobic material contained therein into a chamber individual thereto;

moving the individual chamber to the outer zone of a rotating frame thereby individually centrifuging each spherical shell member with the oleophilic, hydrophobic material remaining therein and thereby removing the liquid hydrocarbon material from the oleophilic, hydrophobic material within the spherical shell members; and

subsequently guiding each spherical shell member with the oleophilic, hydrophobic material remaining therein out of its respective centrifuging chamber.

16. A system for removing oil from the surface of a body of water comprising:

a plurality of discrete oil-absorbent members having an outer rigid shell with apertures therethrough and oleophilic material enclosed within said rigid shell;

means for dispensing said absorbent members on the surface of the water to thereby absorb the oil and for collecting the resulting oil-filled members;

a stationary housing mounted on a vessel and including structure for receiving said oil-filled members;

a frame disposed within said stationary housing and rotatable about a central axis;

power means for rotating said frame;

a rotatable wheel eccentrically mounted on said frame and having apertures about the periphery thereof for receiving said rigid shell absorbent members, said wheel being positioned on said frame such that the rotation of said wheel carries said absorbent members from a central region of said frame to the outer periphery of said frame; and

drive means associated with said frame for rotating said wheel simultaneously with the rotation of said frame, whereby said absorbent members are carried to the outer periphery of said rotating frame during rotation of said frame and said wheel, thereby subjecting said absorbent members to a centrifugal force to remove the oil therefrom.

3,976,571

REDOX RESIN PROCESS

Andre Rio, Lyon, France, assignor to Rhone-Poulenc S.A., Paris, France

Filed Oct. 23, 1974, Ser. No. 517,252

Claims priority, application France, Oct. 26, 1973, 73.38281

Int. Cl.² C02B 1/14

U.S. Cl. 210—38 B 6 Claims

1. Process for extracting a reducible metal ion from an aqueous solution containing it, wherein the pH of the aqueous solution is from 1.5 to 6, which comprises contacting said solution with an extracting amount of a water-insoluble granulated redox resin obtained by a process which comprises the following steps, in sequence:

i. polycondensating in suspension in a water-immiscible inert diluent containing an alcohol of 3 to 20 carbon atoms, a mixture of formaldehyde, pyrocatechol and an aromatic diamine, in which mixture the diamine constitutes 5 to 35 mol % of the mixture of pyrocatechol and diamine, the formaldehyde constitutes 1.1 to 1.5 moles per mol of pyrocatechol and 2.2 to 3 mols per mol of diamine,

ii. heat treating the polycondensate or reaction mixture containing the polycondensate at about 70° to about 110°C., and

iii. removing the alcohol present in the resulting resin.

3,976,572

AIRCRAFT FUEL CONTAMINANT TESTER

Franklin G. Reick, Westwood, N.J., assignor to Michael Ebert, Mamaroneck, N.Y., a part interest

Continuation-in-part of Ser. No. 430,621, Jan. 4, 1974, Pat. No. 3,931,428. This application Jan. 8, 1975, Ser. No. 539,528

Int. Cl.² B01D 39/16, 13/00

U.S. Cl. 210—94 9 Claims

8. A unit for visually testing fuel for the presence of water, said unit comprising a transparent cylinder whose bottom is closed and whose top is open, said cylinder being divided by a filter element into a transparent upper chamber and a transparent lower chamber, said lower chamber including a vent open to the atmosphere, said element being constituted by a selectively permeable hydrophobic material which passes only the fuel component in a sample supplied to the upper chamber into the lower chamber where it is visible to an observer and completely blocks the passage of the water component contained in the sample so that the water is retained in the upper chamber where it is visible to the observer, whereby the presence of water is positively indicated, said filter element being

formed of a porous substrate constituted by non-woven, spunbonded fibers selected from the class consisting of polyethylene and polyester fibers, said fibers having a hydrophobic coating therein which includes fumed silicon dioxide particles.

3,976,573

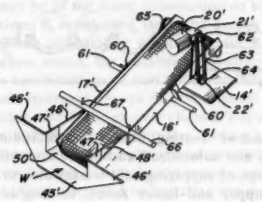
TRASH CATCHING DEVICE

John M. Miller, Rte. 1, Box 273, Rocky Ford, Colo. 81067

Filed Jan. 17, 1975, Ser. No. 541,715

Int. Cl.² B01D 33/14

U.S. Cl. 210—158 3 Claims



1. A device for removing trash or debris and intended for use in a ditch having banks and water flowing therethrough to a predetermined level and below said banks, comprising:

a pair of parallel rollers mounted on shafts spaced horizontally and vertically;

a framework adapted to be supported by the banks of said ditch and to support one roller shaft upstream and below said predetermined level and the other roller shaft downstream and above the level of the ditch banks;

an endless screen extending around and between said rollers and thus having an upper reach and a lower reach;

means for rotating at least one of said rollers and thereby move said screen upwardly from the lower roller to the upper roller, along said upper reach, then around said upper roller and downwardly to said lower roller, along said lower reach, then around said lower roller;

said framework having plates extending between said rollers and flanking each side of said upper reach of said screen, said plates extending above said upper reach;

a partition constructed and arranged to be positioned upright and transversely of said ditch and to extend between

said banks, with the upper edge of said partition above said predetermined level and said partition being adjacent but upstream of said lower roller, said partition having a notch whose lower edge is adapted to be positioned opposite said lower roller and below the upper edge thereof, with the side edges of said notch being opposite the side edges of said screen; and

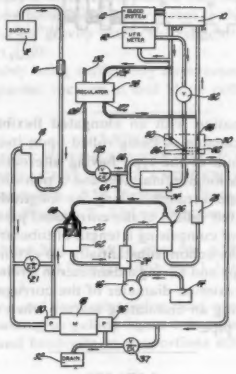
a water funnel having a base constructed and arranged to extend from the lower edge of said notch to said screen and a pair of upright side members adapted to extend from the sides of said notch to positions at either side of said screen.

3,976,574

NEGATIVE PRESSURE CONTROL SYSTEM

Robert Lee White, Golden, Colo., assignor to Cobe Laboratories, Inc., Lakewood, Colo.

Filed Nov. 4, 1974, Ser. No. 520,336
Int. Cl.² B01D 31/00
U.S. Cl. 210—188 10 Claims



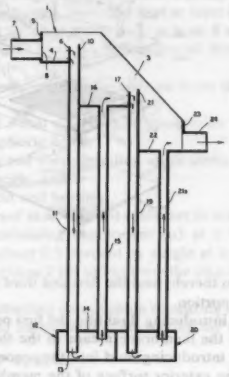
1. In a dialysis machine, a negative pressure control system comprising a liquid conduit defining a flow path extending from a liquid source to a liquid drain, and adapted to include a dialyzer in said flow path, a flow controller in said flow path upstream of the dialyzer and constructed and arranged to restrict the flow rate through said conduit to a predetermined maximum value, a first positive displacement pump in said flow path between the flow controller and the dialyzer and having a pumping capacity exceeding said maximum value whereby a negative pressure is produced in the conduit between the flow controller and the first pump, a second positive displacement pump in said flow path between the dialyzer and the drain and having a pumping capacity exceeding that of said first pump whereby a negative pressure is produced in the conduit between the pumps and in the dialyzer, deaerating means in said flow path including a gas accumulator upstream of said dialyzer and a gas discharge conduit connected between the gas accumulator and the flow path downstream of said dialyzer, and negative pressure control means connected with the conduit between the pumps for regulating the negative pressure of the liquid in the dialyzer.

3,976,575

LIQUID AERATION DEVICE

John K. Sullins, Kingsport, Tenn., assignor to Canton Textile Mills, Inc., Canton, Ga.

Filed July 28, 1975, Ser. No. 599,876
Int. Cl.² C02B 1/34; B01F 3/04
U.S. Cl. 210—220 12 Claims



1. A liquid aeration device comprising an open top head box having a bottom, a pair of spaced side walls interconnected with said bottom, and a pair of spaced transverse walls interconnected with said side walls and said bottom to form a receiver chamber, means associated with said receiver chamber for supplying liquid thereto to be aerated, at least one orifice formed in one transverse wall of said head box through which liquid flows at high velocity and which reduces the liquid pressure so as to effect aeration of the liquid directly from atmosphere, a vertically disposed downcomer conduit arranged with its upper end at a level somewhat below and downstream from said orifice for receiving free falling liquid flowing through said orifice, a gastight pressure chamber interconnected with the lower end of said downcomer conduit, and having only a vertically disposed riser conduit having its lower end interconnected with said pressure chamber and arranged with its upper end at a level below the upper end of said downcomer conduit for discharging aerated liquid, and said vertically disposed riser conduit being connected to the top of said pressure chamber and extending into said pressure chamber below the liquid level therein.

3,976,576

DIALYZER CARTRIDGE

Stephen C. Jacobsen; Homer R. Smith, and Tawny R. Koncher, all of Salt Lake City, Utah, assignors to The University of Utah, Salt Lake City, Utah

Continuation of Ser. No. 456,695, Jan. 1, 1974, abandoned.
This application June 12, 1975, Ser. No. 586,490
Int. Cl.² B01D 31/00
U.S. Cl. 210—321 B 10 Claims

1. A dialyzer cartridge comprising

a gasket member defining a hollow,

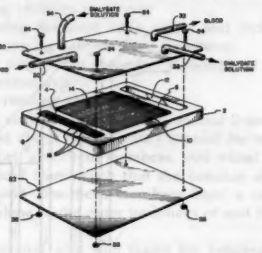
first and second cross members affixed in and extending between the side walls of the gasket member to divide the hollow into first, second and third portions,

said gasket member and cross members being constructed of a resilient material,

membrane means for carrying fluid, said membrane means being embedded in the cross members to extend therebetween across the second portion of the hollow to provide a passageway for carrying the fluid between the first and third portion of the hollow,

a pair of plates for securing the gasket member therebetween, the gasket member, cross members and plates defining a substantially planar profile,

means for urging the two plates together to compress the gasket member and cross members therebetween and to press the cross member material against the membrane



means to thereby seal the first and third portions from the second portion,

means for introducing fluid into the first portion and to flow through the membrane means to the third portion,

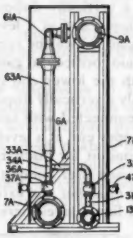
means for introducing fluid into the second portion to flow about the exterior surface of the membrane means.

3,976,577

FILTER UNIT WITH PROTECTED VALVE CONTROLLERS

Danny K. Kaiser, Three Rivers, Mich., assignor to Dover Corporation, Portage, Mich.

Filed Dec. 16, 1974, Ser. No. 532,952
Int. Cl.² B01D *23/38*
U.S. Cl. 210—333 R **13 Claims**



1. A filter assembly for installation into a closed pressurized system and which is capable of handling fluids at elevated temperatures, comprising:

an inlet conduit, an outlet conduit and a drain conduit, said conduits extending substantially in a common direction, said conduits being contained in a first zone;

a plurality of substantially side-by-side filter units distributed along said conduits and all contained in a second zone, said filter units having inlets and outlets;

a group of first valves distributed along said conduits and a group of second valves also distributed along said conduits;

first conduit means each including a said first valve and a said second valve connected in series therein and connecting said inlet conduit to said drain conduit, second conduit means connecting the inlets of said filter units to said first conduit means between said group of first valves and said group of second valves, and third conduit means connecting the outlets of said filter units to the outlet conduit, said first and second zones and said valves and said conduit means all being contained in a common zone, and

a plurality of valve actuators opposed to said valves, all said valve actuators being spaced outwardly of and away from said common zone, thereby positioning said valve acutators out of heat within said common zone and also rendering said valve actuators readily accessible for inspection, service and/or replacement;

means operatively connecting said actuators to said valves and extending into said common zone from said actuators; and

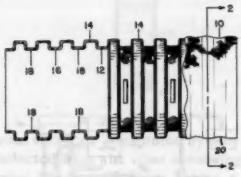
heat insulating means separating said actuators from said conduits, filter units and conduit means.

3,976,578

PROTECTED SLEEVE FOR CORRUGATED DRAINAGE TUBES

Frank T. Beane, 216 Banner Ave., Concord, N.C. 28025

Filed June 25, 1974, Ser. No. 483,391
Int. Cl.² E02B *13/00*
U.S. Cl. 210—484 **3 Claims**



1. In combination with an elongated flexible corrugated drainage pipe capable of being rolled upon itself for storage and shipment and of the type having alternating peaks and valleys along its longitudinal axis and a plurality of openings through the pipe arranged along its longitudinal axis and located in selected valleys of the corrugated pipe, a protective permeable sleeve comprising a length of tubular knit fabric of lock-stitch construction substantially co-extensive with the length of the pipe and having a diameter in a relaxed condition less than the maximum diameter of the corrugated pipe, and said sleeve having an undulating surface when positioned on the corrugated pipe.

3,976,579

NOVEL ASSEMBLY

Michael C. Bennett, Summit, N.J., assignor to Becton, Dickinson and Company, East Rutherford, N.J.

Filed July 10, 1975, Ser. No. 594,712
Int. Cl.² B01D *21/26*
U.S. Cl. 210—516 **1 Claim**

1. An assembly for the collection, separation and isolation of serum or plasma from blood, which comprises;

a. a tubular container having an open end and a closed end and which together with its ends defines a blood collection chamber;

b. a self-sealing, cannula-penetrable, elastomeric closure member hermetically sealing said open end;

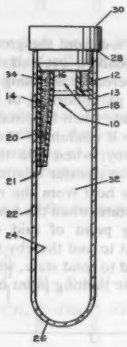
c. a thixotrope reservoir secured to an inner wall of said container adjacent to said closure member, which comprises;

i. a tubular body having a closed lower end which defines a thixotrope holding space,

ii. a conduit passing through the center of said reservoir and providing communication between the adjacent closure member and said blood collection chamber; and

iii. an open nozzle extending downwardly from said reservoir along an inner wall of said container and providing communication between said holding space and the blood collection chamber, said nozzle being of a dimension which is insufficient to permit the passage of

a thixotrope under the force of one gravity but sufficient to permit the passage of said thixotrope under centrifugal force; and



d. a thixotropic sealant disposed in said holding space, said thixotrope being inert with respect to the blood and having a specific gravity within the range of from about 1.03 to about 1.09;

said assembly being sufficiently air-evacuated to provide at least a partial vacuum in said blood collection chamber.

3,976,580

GELLED FIRE EXTINGUISHER FLUID COMPRISING POLYACRYLAMIDE AND BENTONITE

Bernard Kaminstein, 329 Franklin Place, Paramus, N.J. 07652, and Wyman F. Uhl, 6 Kitchener Road, Sterling, Mass. 01564

Filed Nov. 7, 1975, Ser. No. 629,712

Int. Cl.² A62D *1/00;* **B01J** *13/00*

U.S. Cl. 252—2 **30 Claims**

1. A cooling and fire extinguisher fluid comprising an aqueous gel containing as gelling agent a combination of a polyacrylamide and bentonite in proportions effective to form a firm gel.

3,976,581

SURFACE TREATING COMPOSITIONS CONTAINING AMMONIOAMIDATE COMPOUNDS

Terence James Rose, Whitley Bay, England, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Continuation-in-part of Ser. No. 243,090, April 11, 1972, abandoned. This application June 28, 1973, Ser. No. 374,589

Claims priority, application United Kingdom, Jan. 10, 1972, 1054/72

Int. Cl.² D06M *13/40, 13/46;* **C11D** *1/88*

U.S. Cl. 252—8.8 **12 Claims**

1. A surface-treating composition suitable for hair and fabric softening consisting essentially of:

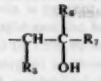
a. a substituted ammonioamidate having the formula

$$R_1\,CO\,N^-\,N^+\,R_2\,R_3\,R_4$$

or a cationic adduct thereof having the formula

$$R_1\,CO\,NH\,N\,R_2\,R_3\,R_4{}^+\,X^-$$

wherein X is an anion; R_1 is an alkyl, phenyl, or alkylphenyl group having 1 to 25 carbon atoms; each of R_2 and R_3 is a methyl, ethyl, hydroxymethyl, hydroxyethyl or cyanoethyl group; and R_4 is either an alkyl having 1 to 25 carbon atoms or:



wherein each of R_5 and R_6 is a hydrogen or an alkyl group with 1 to 4 carbon atoms, and R_7 is a group defined as R_1, benzyl or hydrogen, provided that at least one of R_1 and R_4 contains an alkyl group with at least 8 carbon atoms, said compound having a pKa value of from about 5 to about 7; and

b. a pH buffering compound selected from the group consisting of:

i. the alkali metal acid salts of phosphoric acid, and the polyphosphoric acids;

ii. the acids and corresponding alkali metal salts of weak organic acids, and;

iii. boric acid and borates;

or mixtures thereof in an amount sufficient to maintain the pH of a solution containing component (a) at a level of from about 0.001 to about 0.5 percent by weight at less than, equal to, or not greater than 2 pH units above the pKa of component (a).

12. A fabric softening composition consisting essentially of:

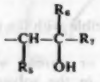
a. a substituted ammonioamidate having the formula

$$R_1\,CO\,N^-\,N^+\,R_2\,R_3\,R_4$$

or a cationic adduct thereof having the formula

$$R_1\,CO\,NH\,N\,R_2\,R_3\,R_4{}^+\,X^-$$

wherein X is an anion; R_1 is an alkyl, phenyl, or alkylphenyl group having 1 to 25 carbon atoms; each of R_2 and R_3 is a methyl, ethyl, hydroxymethyl, hydroxyethyl or cyanoethyl group; and R_4 is either an alkyl having 1 to 25 carbon atoms or:



wherein each of R_5 and R_6 is a hydrogen or an alkyl group with 1 to 4 carbon atoms, and R_7 is a group defined as R_1, provided that at least one of R_1 and R_4 contains an alkyl group with at least 8 carbon atoms, said compound having a pKa value of from about 5 to about 7; and

b. a pH buffering compound selected from the group consisting of the acids and corresponding alkali metal salts of citric acid, lactic acid, glycolic acid, malic acid, tartaric acid, acetic acid, capric acid, benzoic acid, and adipic acid;

or mixtures thereof wherein the buffering compound is present in amount sufficient to maintain the pH of a solution containing component (a) at a level of from about 0.02 to about 0.2 percent by weight at less than, equal to, or not greater than 2 pH units above the pKa of component (a).

3,976,582

OPTIMIZING PETROLEUM RECOVERY MICELLAR SYSTEMS UTILIZING ZETA POTENTIAL

Larry J. Douglas, and Charles B. Wenger, both of Denver, Colo., assignors to Marathon Oil Company, Findlay, Ohio

Filed Sept. 13, 1973, Ser. No. 397,025

Int. Cl.² E21B *43/20, 43/22*

U.S. Cl. 252—8.55 D **14 Claims**

1. A process for stabilizing micellar systems for use in displacing petroleum in subterranean formations comprising surfactants, hydrocarbon, electrolyte solution in water, and cosurfactant by measuring the zeta potential of said micellar

systems and thereafter varying the water or cosurfactant concentration to achieve a maximum zeta potential.

3,976,583

ELECTROPHOTOGRAPHIC DEVELOPER LIQUID

Heinz Herrmann, and Alfred Brechlin, both of Wiesbaden-Biebrich, Germany, assignors to Hoechst Aktiengesellschaft, Germany

Filed Dec. 19, 1973, Ser. No. 425,946

Claims priority, application Germany, Dec. 21, 1972, 2262603

Int. Cl.² G03G 9/12

U.S. Cl. 252—62.1 L **5 Claims**

1. An electrophotographic liquid dispersion developer for transferring a developed charge image from a photoconductor onto a paper comprising an electrically insulating carrier liquid, having a kauri-butanol value of less than about 30, in which is dispersed a solution containing

a. a solvent organic liquid, which is miscible with the carrier liquid,

b. a copolymer (A) of vinyl toluene or styrene with an acrylic acid ester which is soluble in the solvent and substantially insoluble in the carrier liquid,

c. a copolymer (B) of butadiene with styrene, which is soluble in the solvent and in the carrier liquid, said copolymers (A) and (B) being present in an amount between about 30 and 70 percent by weight, calculated on the weight of solvent,

d. a coloring material substantially insoluble in the carrier liquid, and

e. water in an amount of about 0.01 to 10 percent by weight, calculated on the weight of copolymers A and B present.

4. A process for the preparation of an electrophotographic liquid dispersion developer for transferring a developed charge image from a photoconductor layer onto paper comprising dispersing in an electrically insulating carrier liquid having a kauri-butanol value of less than about 30, a solution containing

a. a solvent organic liquid, which is miscible with the carrier liquid,

b. a copolymer (A) of vinyl toluene or styrene with an acrylic acid ester, which is soluble in the solvent and substantially insoluble in the carrier liquid,

c. a copolymer (B) of butadiene with styrene, which is soluble in the solvent and in the carrier liquid, said copolymers (A) and (B) being present in an amount between about 30 and 70 percent by weight, calculated on the weight of solvent,

d. a coloring material substantially insoluble in the carrier liquid, and

e. water in an amount of about 0.01 to 10 percent by weight, calculated on the weight of copolymers A and B present.

3,976,584

THERMAL ENERGY STORAGE MATERIAL

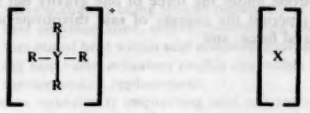
Leslie Leifer, Hancock, Mich., assignor to Board of Control of Michigan Technological University, Houghton, Mich.

Filed May 18, 1973, Ser. No. 361,834

Int. Cl.² C09K 5/06

U.S. Cl. 252—77 **16 Claims**

1. A thermal energy storage device for thermally conditioning a region comprising a sealed container made from a thin wall, thermally conductive material, having a large surface-to-volume ratio and containing as a thermal energy storage material a substantially solid clathrate which has a melting point above 32° F, has a latent heat of fusion approaching that of water, does not decompose at ambient temperature and pressure and is characterized by the **0—0** distance of water in the hydrogen bonded cage being less than about 2.87 Angstroms, said clathrate being formed by combining with water a clathrate forming compound having the formula



where each R is selected from the group consisting of alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl and aryl radicals, and combinations thereof containing 1 through 8 carbon atoms; Y is nitrogen, phosphorous, or sulfur; and X is chloride, fluoride, or bromide when R contains 1 through 8 carbon atoms, is iodide when R contains 1 through 5 carbon atoms, or is butyrate, whereby, when said thermal energy storage device is placed in heat transfer relationship with the region, said clathrate absorbs heat from the region, while changing from a solid to liquid state, when the temperature of the region is above the melting point of said clathrate, and/or said clathrate releases heat to and thereby heats the region, while changing from a liquid to solid state, when the temperature of the region is below the melting point of said clathrate.

3,976,585

FUNCTIONAL FLUID COMPOSITIONS CONTAINING EPOXIDE STABILIZERS

John F. Herber, St. Louis; Robert W. Street, and William R. Richard, Jr., both of Kirkwood, all of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Mar. 25, 1974, Ser. No. 454,538

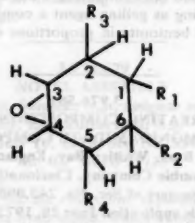
Int. Cl.² C10M 3/40, 3/20

U.S. Cl. 252—78.5 **12 Claims**

1. A functional fluid composition comprising

A. at least about 50 percent by weight of a base stock material selected from the group consisting of esters and amides of an acid of phosphorus, di- or tricarboxylic acid esters, esters of polyhydric compounds, and mixtures thereof, and

B. from about 0.1 to 15 percent by weight of an epoxide compound represented by the structure



wherein R_1, R_2, R_3, and R_4 are individually an alkyl radical having from 1 to about 18 carbon atoms or hydrogen, provided that at least one R is an alkyl group.

3,976,586

MONOESTERS DERIVED FROM ETHOXYLATED HIGHER ALCOHOLS AND THIODISUCCINIC ACID AS DETERGENT BUILDERS

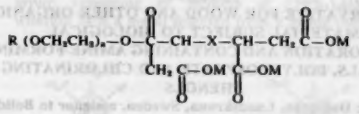
Paritosh M. Chakrabarti, Wayne, N.J., assignor to GAF Corporation, New York, N.Y.

Filed Oct. 8, 1975, Ser. No. 620,590

Int. Cl.² C11D 1/06; C07C 149/20

U.S. Cl. 252—89 R **15 Claims**

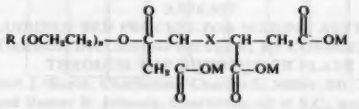
1. A compound of the formula



wherein R is a hydrocarbon having from 12 to 22 carbon atoms, X is sulfur, sulfinyl or sulfonyl, M is hydrogen, a monovalent metal, ammonium or substituted ammonium and *n* is an integer ranging from 2 to 15.

7. A detergent composition consisting essentially of

1. an organic water soluble detergent surfactant selected from the group consisting of anionic, nonionic, zwitterionic, and ampholytic detergent surfactants, and mixtures thereof; and
2. a builder compound of the formula



wherein R is a hydrocarbon radical having from 12 to 22 carbon atoms, X is sulfur, sulfinyl, or sulfonyl, M is hydrogen, a monovalent metal, ammonium or substituted ammonium and *n* is an integer ranging from 2 to 15.

3,976,587
AMINO DERIVATIVES OF TETRASUBSTITUTED BENZENE COMPOUNDS

John J. Merianos, Jersey City, and Phillip Adams, Murray Hill, both of N.J., assignors to Millmaster Onyx Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 549,170, Feb. 12, 1975, Pat. No. 3,960,538, which is a division of Ser. No. 360,448, May 15, 1974, Pat. No. 3,886,284, which is a continuation-in-part of Ser. No. 291,824, Sept. 25, 1972, Pat. No. 3,838,197, which is a continuation-in-part of Ser. No. 130,783, April 2, 1971, Pat. No. 3,821,407. This application June 10, 1975, Ser. No. 585,657

Int. Cl.² C11D *3/46;* **C07C** *87/20*

U.S. Cl. 252—106 **7 Claims**

1. The compound N-trimethylbenzyl diethylenetriamine.

5. A disinfectant and cleansing composition consisting essentially of a mixture of a disinfectant consisting of N-trimethylbenzyl diethylenetriamine and a surfactant selected from the group consisting of anionic, cationic and non-ionic surfactants, the disinfectant and the surfactant each being present in an effective amount for its purpose.

3,976,588
DETERGENTS PROVIDING FASTER DRYING OF CLEANSED SUBSTRATES

James Hugh McLaughlin, Chatham, Mass., assignor to Center for New Product Development, New York, N.Y.

Filed Jan. 14, 1975, Ser. No. 540,993

Int. Cl.² A61K *7/08;* **C11D** *3/20, 9/26;* **D06L** *1/12*

U.S. Cl. 252—117 **8 Claims**

1. A detergent composition for cleansing and conditioning the hair which is characterized by a faster drying rate for the wet cleansed hair consisting essentially of a cleansing proportion of a water soluble, foaming non-cationic, organic detergent selected from the class consisting of anionic, amphoteric, polar nonionic and zwitterionic detergents and mixtures thereof, an aluminum soap containing 12 to 18 carbon atoms, a wax selected from the class consisting of naturally-occuring and synthetic waxes having a melting point of at least 120°F and an aqueous medium wherein said detergent is present in an amount of about 10 to about 40% by weight, said soap is present in an amount of about 0.5 to about 10% by weight, said wax is present in an amount of about 0.1 to about 3.0% by weight and the balance is said aqueous medium containing from 0 to 15% by weight of a C_2–C_3 alkanol, the weight ratio of detergent to aluminum soap being no greater than 40:1.

8. A method of decreasing the time required for drying of cleansed wet hair which comprises the steps of contacting the hair with an aqueous bath containing a detersive portion of a water soluble, foaming, non-cationic, organic detergent selected from the class consisting of anionic, amphoteric, polar nonionic and zwitterionic detergents and mixtures thereof, and an aluminum soap containing 12 to 18 carbon atoms, wherein said detergent is present in an amount of about 10 to about 40% by weight, said soap is present in an amount of about 0.5 to about 10% by weight and the balance is an aqueous medium containing from 0 to 15% by weight of a C_2 – C_3 alkanol, the weight ratio of detergent to soap being no greater than 40:1, rinsing the cleansed hair with water, and drying the cleansed hair.

3,976,589
METHODS OF SCALE INHIBITION

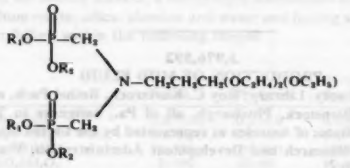
Robert S. Mitchell, Webster Groves, Mo., assignor to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 169,050, Aug. 4, 1971, abandoned. This application Dec. 16, 1974, Ser. No. 533,037

Int. Cl.² C02B *5/00, 5/04*

U.S. Cl. 252—180 **8 Claims**

1. A method of inhibiting the precipitation of scale-forming salts in an aqueous system comprising adding at least a precipitation inhibiting amount of a substituted tertiary amine having the general formula



wherein R_1 and R_2 are alike or unlike and are each independently selected from the group consisting of alkali metal ions, hydrogen, and ammonium ions.

3,976,590
MIXTURE OF HOMOLOGUE ANHYDRIDES OF TETRAHYDROPHTHALIC ANHYDRIDE AND THE PROCESS FOR OBTAINING SAME

Emile Yax, 11, rue Jeanne d'Arc,, Petite-Rosselle, Moselle, France, and Mechthild Zander, Rotenbergstrasse 36, Sarrebruck, Germany

Filed Aug. 26, 1974, Ser. No. 500,738

Claims priority, application France, Aug. 27, 1973, 73.30957

Int. Cl.² C09K *3/00;* **C07D** *307/89, 307/93*

U.S. Cl. 252—182 **8 Claims**

1. A process for obtaining a mixture of anhydrides homologous to tetrahydrophthalic anhydride, having a melting point between 40° and 60°C and consisting essentially of from 30 to 50 % of endo-methylene-tetrahydrophthalic anhydride, from 30 to 45 % of methyl-4-tetrahydrophthalic anhydride and from 10 to 25 % of methyl-3-tetrahydrophthalic anhydride, comprising

reacting maleic anhydride with a petro-chemical C5 fraction, containing on the order of about 50 % of reactant dienes comprising essentially cyclopentadiene, isoprene and piperylene in substantially the same amount, together with other unsaturated C5 hydrocarbon fractions, selected from the group comprising the fractions derived from steam-cracking and pyrolysis of naptha, by passing

said maleic anhydride counter-current to said petrochemical C5 fraction,

controlling the conditions of temperature between 100° and 130°C and of flow-rate to provide an essentially complete reaction, and

recovering the resulting mixture of anhydrides.

3,976,591

NOVEL CHEMICAL SUBSTANCE PRESENTING A NEMATIC LIQUID PHASE

Jean Claude Dubois; Annie Zann, and Jean Claude Lavenu, all of Paris, France, assignors to Thomson-CSF, Paris, France

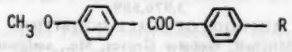
Filed May 16, 1973, Ser. No. 360,894

Claims priority, application France, May 19, 1972, 72.18032

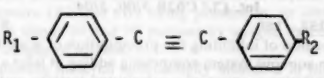
Int. Cl.² C09K *3/34*; G02F *1/13*

U.S. Cl. 252—299 **2 Claims**

1. A nematic liquid crystal mixture, which comprises a mixture of an ester of the formula



wherein R represents an alkyl group having 3, 5 or 6 carbon atoms in combination with a compound of the formula



wherein R_1 and R_2 represent C_nH_{2n+1}—O, C_nH_{2n+1}—COO, C_nH_{2n+1}, or C_nH_{2n+1}—O—COO wherein *n* is an integer of from 1 to 14.

3,976,592

PRODUCTION OF MHD FLUID

James J. Lacey, Library; Roy C. Kurtzrock, Bethel Park, and Daniel Bienstock, Pittsburgh, all of Pa., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Continuation-in-part of Ser. No. 344,320, March 23, 1973, Pat. No. 3,865,344. This application Dec. 19, 1974, Ser. No. 534,328

Int. Cl.² C01B *2/00*

U.S. Cl. 252—372 **2 Claims**

1. A process for preparation of a hot gaseous fluid of low ash content, suitable for use in open-cycle MHD power generation, comprising (1) partial combustion of a fossil fuel selected from the group consisting of coal, char, and fuel oil by means of preheated air at a temperature of about 2000° to 3000°F. and a pressure of about 3 to 30 atmosphere to produce a hot gaseous product comprising CO_2, CO, and H_2O, (2) reformation of the gaseous product from (1) by means of a fluidized bed, including char, whereby CO_2 and H_2O are converted to CO and H_2, and (3) combustion of CO and H_2 from (2) by reaction with preheated air to produce a low-ash-content gaseous product comprising CO_2 and H_2O and having a temperature of about 4000° to 5000°F.

3,976,593

AMINE BISULFITES

Francis J. Hartke, Bridgeton, and James E. Davis, Affton, both of Mo., assignors to Petrolite Corporation, St. Louis, Mo.

Filed May 19, 1975, Ser. No. 578,369

Int. Cl.² C09K *3/00*; C23F *9/00*; C07D *295/00*

U.S. Cl. 252—391 **16 Claims**

1. A corrosion inhibiting composition comprising triethanolamine bisulfite.

2. A corrosion inhibiting composition comprising a tertinary heterocyclic amine bisulfite.

3,976,594

PRESERVATIVE FOR WOOD AND OTHER ORGANIC MATERIAL SUBJECT TO BIOLOGICAL DETERIORATION AND CONTAINING AMINE-FORMING METALS, POLYPHOSPHATE AND CHLORINATING PHENOLS

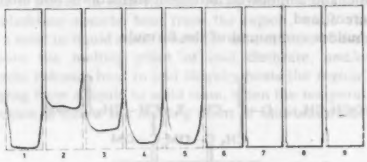
Sven-Eric Dahlgren, Landskrona, Sweden, assignor to Boliden Aktiebolag, Stockholm, Sweden

Filed Apr. 15, 1974, Ser. No. 460,902

Claims priority, application Sweden, Apr. 27, 1973, 7305979

Int. Cl.² C09K *15/32*, *15/16*, *15/08*; B27K *3/00*

U.S. Cl. 252—400 A **10 Claims**



1. A water-soluble preservative for wood and other organic materials subject to biological deterioration, containing an amine-forming biologically active metal selected from the group consisting of copper, zinc, cobolt, nickel and mixtures thereof; polyphosphate; amine; chlorinated phenols and carbon dioxide, and in that the mole ratio of polyphosphate:amine-forming metal is 0.5 – 1.5, the mole ratio of amine:amine-forming metal is 1 – 7, the mole ratio of amine:carbon dioxide is 1 – 4 and the mole ratio of amine-forming metal:chlorinated phenols calculated as pentachlorophenol is 0.5 – 15.

3,976,595

SULFONIC ACID-TYPE CATALYSTS USEFUL IN, FOR EXAMPLE, ESTERIFICATION REACTIONS

Robert H. Scott, Corpus Christi, and Dan L. Gaulding, Driscoll, both of Tex., assignors to Celanese Corporation, New York, N.Y.

Filed Mar. 17, 1975, Ser. No. 559,106

Int. Cl.² B01J *27/02*

U.S. Cl. 252—428 **5 Claims**

1. An improved acid-reacting catalyst consisting essentially of a mixture of at least one hydrocarbonyl sulfonic acid with at least one phosphorus compound selected from the group consisting of tri-hydrocarbyl phosphate esters, phosphate salts of alkali metals, and the inorganic phosphorus acids.

3,976,596

HYDRIDOMETALLIC CARBORANE CATALYTIC COMPOUNDS

Marion F. Hawthorne, Brentwood, Calif., and Timm E. Paxson, Houston, Tex., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 26, 1975, Ser. No. 562,070

Int. Cl.² B01J *31/12*; C07F *15/00*

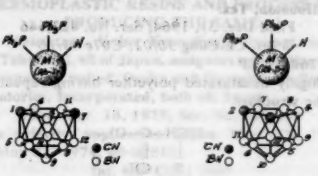
U.S. Cl. 252—431 P **7 Claims**

1. A hydridometallic compound for use as a catalyst, said compound being selected from a group consisting of isomers of $R(PPh_3)_2HMC_2B_9H_{10}$ wherein M is a metal selected from a group consisting of rhodium and iridium and wherein R is selected from a group consisting of CH_3—, Ph, CH_2 and CH_2OCH_2—.

4. An homogeneous catalytic solution for the hydrogenation, isomerization and hydroformylation of olefins and the hydrosilylation of ketones comprising:

an hydridometallic carborane compound selected from a

group consisting of isomers of $(PPh_3)_2HMC_2B_9H_{11}$ wherein M is a metal selected from a group consisting of



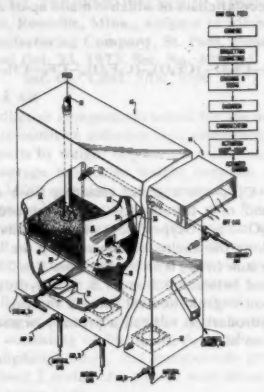
rhodium and iridium, and
a solvent for said compound.

3,976,597

FLUIDIZED BED PROCESS FOR MAKING ACTIVATED CARBON INCLUDING HEATING BY CONDUCTION THROUGH THE DISTRIBUTOR PLATE

Albert J. Repik, Charleston; Charles E. Miller, Mt. Pleasant, and Homer R. Johnson, Charleston, all of S.C., assignors to Westvaco Corporation, New York, N.Y.

Filed June 9, 1975, Ser. No. 585,259
Int. Cl.² B01J 21/18, 37/00
U.S. Cl. 252—445 5 Claims



1. A process for manufacturing activated carbon from granular coal particles that have been rendered non-agglomerative and carbonized which comprises:

a. continuously feeding said non-agglomerative and carbonized coal particles into a fluidized bed supported on a horizontal gas distributor plate;

b. and at the same time passing an activating gas from below through said gas distributor plate at a velocity at least sufficient to provide for fluidizing said coal particles, said gas distributor plate having tuyeres projecting above the upper surface of said plate whereby substantially all of said coal particles on the upper plate surface in said fluidized bed are in continuous motion;

c. activating said coal particles by maintaining a constant level of thermal energy required for activation at maximum yield in said fluidized bed by supplying,

1. at least 10% of said thermal energy by conduction of heat from hot activating gas below said distributor plate through said plate to the fluidized bed, and

2. the remainder of said thermal energy being supplied by the sensible heat of the activating gas to thereby provide a temperature in said fluidized bed between 1,000°F. and 2,200°F. while maintaining the upper surface of said gas distributor plate below the sintering temperature of said coal particles; and

d. separating the gases from the thus activated carbon and recovering said activated carbon.

2. The process according to claim 1 wherein said activation is carried out in a plurality of interconnected fluidized beds.

3,976,598

ZEOLITE SYNTHESIS

John C. Daviditz, Hopewell, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Mar. 29, 1974, Ser. No. 456,567
Int. Cl.² B01J 29/06; C01B 33/26
U.S. Cl. 252—455 Z 8 Claims

1. In a process for synthesizing a crystalline molecular sieve type aluminosilicate-containing product comprising zeolite Y or zeolite ZSM-5 by preparation of a reaction mixture containing, for zeolite Y, sodium oxide, silica, alumina and water and having a composition falling within one of the following ranges:

	Na_2O/SiO_2	SiO_2/Al_2O_3	H_2O/Na_2O
Range 1	0.20 to 0.40	10 to 40	25 to 60
Range 2	0.41 to 0.60	10 to 30	20 to 60
Range 3	0.61 to 0.80	7 to 30	20 to 60
Range 4	0.6 to 1.0	8 to 30	12 to 90
Range 5	1.5 to 1.7	10 to 30	20 to 90
Range 6	1.9 to 2.1	about 10	40 to 90
Range 7	0.70 to 0.90	10 to 25	12 to 90
Range 8	0.28 to 0.30	8 to 10	30 to 50

and, for zeolite ZSM-5, a tetrapropyl ammonium compound, sodium oxide, silica, alumina and water and having a composition falling within the following ranges:

	Broad	Preferred	Particularly Preferred
OH^-/SiO_2	0.07–1.0	0.1–0.8	0.2–0.75
$R_4N^+/(R_4N^+ + Na^+)$	0.2–0.95	0.3–0.9	0.4–0.9
H_2O/OH^-	10–300	10–300	10–300
SiO_2/Al_2O_3	5–100	10–60	10–40

where R is propyl, maintaining the mixture at an elevated temperature until said product is formed, separating and recovering said product; the improvement which comprises utilizing as the principal source of silica and alumina in said reaction mixture a smectite clay which has undergone fusion with sodium chloride.

6. The process of claim 1 wherein the crystalline aluminosilicate molecular sieve type product is contained in a matrix derived from said smectite clay which has undergone said fusion.

3,976,599

OXIDATION CATALYST

James M. Whelan, La Canada, Calif., assignor to The University of Southern California, Los Angeles, Calif.

Division of Ser. No. 194,769, Oct. 8, 1971, Pat. No. 3,885,020.
This application Mar. 10, 1975, Ser. No. 556,670
Int. Cl.² B01J 23/10, 23/22, 23/26, 23/74
U.S. Cl. 252—462 3 Claims

1. A ceramic, mixed oxide, nonstoichiometric, electrically neutral catalyst for treating exhaust gases from the combustion of fossil fuels comprising a homogeneous mixed oxide compound having a unitary crystal structure of the following empirical formula:

$$W_xX_{x'}J_{(1-x-x')}ZO_{(b \pm a')}$$

wherein

W is zirconium, tin or thorium or mixtures thereof;

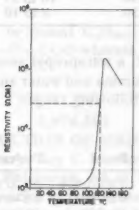
X is an alkaline earth metal or mixture thereof;
J is scandium, yttrium, a rare-earth element, or mixture thereof;
Z is titanium, vanadium, chromium, iron cobalt, nickel, or a mixture thereof, at least 0.01% of Z having an oxidation state other than +3;
k is a number greater than 0 which has a value between 0 and about 0.1;
m' is a number having a value of from 0 to about 0.26, provided *m'* has a value other than 0 when *n* has a value of 0; and
n is a number having a value from 0 to about 0.51, provided when *n* has a value of 0, *k* is a number greater than 0 which has a value between 0 and about 0.05.

3,976,600

PROCESS FOR MAKING CONDUCTIVE POLYMERS

John V. Meyer, Brighton, Mass., assignor to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 210,648, Dec. 22, 1971, Pat. No. 3,760,495, which is a continuation-in-part of Ser. No. 6,086, Jan. 27, 1970, Pat. No. 3,673,121. This application May 14, 1973, Ser. No. 360,233
Int. Cl.² H01B *1/04*
U.S. Cl. 252—511 4 Claims



1. An electrical resistance element having a steeply sloped positive temperature coefficient of resistance above an anomaly temperature comprising a polymer selected from the group consisting of, polyethylene oxide, trans 4 polybutadiene and polyethyl acrylate, said polymer having crystalline structure at a temperature below the anomaly temperature and a glass transition lower than approximately 13° F, conductive particles selected from the group consisting of carbon, tin, silver and gold dispersed throughout the polymer, the conductive particles comprising no more than 50% by weight of the polymer and conductive particles, and electrical contacts located on spaced portions of the element.

3,976,601

WATER SOLUBLE LUBRICANT FOR TABLETTING COMPOSITIONS

Norman A. Levin, Somerville, N.J., assignor to Johnson & Johnson, New Brunswick, N.J.

Filed June 24, 1974, Ser. No. 482,403
Int. Cl.² C11D *1/12*
U.S. Cl. 252—550 2 Claims

1. A water-soluble lubricant admixture for use in tablet compositions consisting essentially of magnesium lauryl sulfate powder having an average particle size of from about 12 to about 20 microns and a micronized polyethylene glycol polymer having an average molecular weight of from about 6,000 to about 20,000.

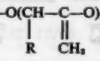
3,976,602

HIGHLY UNSATURATED POLYETHERS

Walter L. Petty, Oakland, Calif., assignor to Shell Oil Company, Houston, Tex.

Filed Dec. 31, 1964, Ser. No. 423,646
Int. Cl. C08g *30/02*; C07c *43/16*
U.S. Cl. 260—2 EP 4 Claims

1. A highly unsaturated polyether having repeating units having the structure



wherein R is a member of the group consisting of hydrogen and alkyl groups, and *n* is an integer greater than 2.

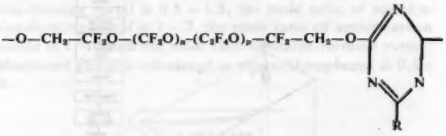
3,976,603

FLUORINATED ELASTOMERIC POLYMERS CONTAINING THE 1,3,5-TRIAZINE RING, AND PROCESS FOR PREPARING SAME

Gerardo Caporiccio, and Gianangelo Bargigia, both of Milan, Italy, assignors to Montedison S.p.A., Milan, Italy

Filed Jan. 22, 1975, Ser. No. 543,161
Claims priority, application Italy, Jan. 23, 1974, 19694/74
Int. Cl.² C08G *73/08*
U.S. Cl. 260—2 R 14 Claims

1. Fluorinated elastomeric polymers the perfluoropolyether macromolecular chain of which is made up of a repeating unit



wherein $-C_2F_4-$ is a group resulting from opening of the double bond of a tetrafluoroethylene molecule, $-C_2F_4O-$ and $-CF_2O-$ are oxyperfluoroalkylene units randomly distributed along the chain, indexes *n* and *p* are integers from 2 to 100, the sum $(n+p)$ is an integer from 5 to 200, the *p/n* ratio is comprised between 0.2 and 1.5, R is hydrogen, halogen, a hydrocarbon organic non-substituted radical, a halogen-substituted hydrocarbon radical, a primary or secondary amino radical or an alkoxy radical.

3,976,604

PREPARATION OF ETHYLENIMINE PREPOLYMER

Earl J. Roberts, and Stanley P. Rowland, both of New Orleans, La., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Division of Ser. No. 279,919, Aug. 11, 1972, Pat. No. 3,885,069. This application Jan. 30, 1975, Ser. No. 545,277
Int. Cl.² C02B *1/46*; D06M *13/48*, *15/12*
U.S. Cl. 260—2 EN 1 Claim

1. A method for producing an ethylenimine prepolymer, the method comprising:
a. mixing ethylenimine with an alkyl halide selected from the group consisting of 1,2-dichloroethane, tris(2-chloroethyl)phosphoramide, bis(2-chloroethylvinyl)-phosphonate, tris(2,3-dibromopropyl)phosphate, tris(1,3-dichloroisopropyl)phosphate, B,B'-dichloroethyl ether and dichloromethane in a molar ratio of about from 44:1 to 27:1; and
b. allowing the mixture to stand at 10° to 50°C for from 2 to 16 hours.

3,976,605

FOAMED PLASTICS OF RESIN COMPOSITIONS COMPRISING PULLULAN TYPE RESINS AND THERMOPLASTIC RESINS AND PROCESS FOR PRODUCING THE SAME

Hiroomi Matsunaga, Kobe; Kozo Tsuji, Ibaragi, and Teruo Saito, Takatsuki, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka and Hayashibara Biochemical Laboratories, Incorporated, both of, Japan

Filed Mar. 18, 1975, Ser. No. 559,443

Claims priority, application Japan, Mar. 28, 1974, 49-35873; May 21, 1974, 49-57518

Int. Cl.[2] C08J *9/06*

U.S. Cl. 260—2.5 HA 15 Claims

1. A foamed plastic of a resin composition comprising 2 to 98% by weight based on the total resin weight of a pullalan type resin having a molecular weight of 10,000 to 5,000,000 selected from the group consisting of pullalan, an etherified pullalan and an esterified pullalan and 98 to 2% by weight based on the total resin weight of at least one thermoplastic resin selected from the group consisting of polyethylene, polypropylene, polystyrene, acrylonitrile-butadiene-styrene copolymer, polymethyl methacrylate, polyvinyl acetate, polyvinyl chloride, polyvinylidene chloride, vinyl acetate-vinyl chloride copolymer, olefin-vinyl acetate copolymers, polycarbonates, polyacetals, polysulfones, polyamides and polyesters.

3,976,606

ADHESIVES TACKIFIED WITH LOW MOLECULAR WEIGHT TERPENE-PHENOLIC RESINS

Ramsis Gobran, Roseville, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Oct. 23, 1973, Ser. No. 408,591

Int. Cl.[2] C08L *7/00, 9/00*

U.S. Cl. 260—4 AR 6 Claims

1. A tacky adhesive composition suited for use as the adhesive for pressure-sensitive adhesive tape comprising

1. 5 to 200 parts by weight terpene-phenolic resin having a number average molecular weight between about 400 and about 3500, said resin being produced by reacting, in an inert atmosphere, in the presence of a Friedel-Crafts catalyst and at a temperature in the range of about 20°C – 130°C, 2 to 4 moles of terpene with one mole of a compound containing at least two phenolic groups, each of said groups having at least one ortho or para position free for alkylation by said terpene, wherein said compound having at least two phenolic grops is selected from the group consisting of bisphenol A, bisphenol B, 4,4'-dihydroxydiphenyl ether, and compounds produced by reacting about 2 moles of a phenol with about 1 mole of a diene or triene and;
2. about 100 parts by weight of a rubbery material selected from the group consisting of natural rubber and cis-polybutadiene.

3,976,607

COPOLYMERS AND PREPARATIONAL METHOD THEREFOR

Takeo Hokama, Chicago, Ill., and Frank Scardiglia, Woodcliff Lake, N.J., assignors to Velsicol Chemical Corporation, Chicago, Ill.

Division of Ser. No. 325,500, Jan. 22, 1973, Pat. No. 3,835,079, which is a division of Ser. No. 85,297, Oct. 29, 1970, Pat. No. 3,757,000, which is a continuation-in-part of Ser. No. 728,332, May 10, 1968, abandoned. This application June 26, 1974, Ser. No. 483,275

Int. Cl.[2] C08F *10/10;* C08L *7/00*

U.S. Cl. 260—4 AR 11 Claims

1. A pressure-sensitive adhesive composition comprising an admixture of an elastomer and a solid, homogeneous and essentially random copolymer of styrene and isobutylene prepared by gradually contacting styrene and isobutylene in a proportion of from about 40 to 90 weight per cent styrene at a polymerization temperature of from about 10°C. to about 50°C. in the presence of a hydrocarbon solvent with a catalyst system of an alkyl aluminum dihalide primary catalyst and at least one co-catalyst selected from the group consisting of water, an alcohol, an alkyl halide and a hydrogen halide, in an amount of from about 2 to about 30 mol per cent based upon the mols of the primary catalyst, maintaining the styrene and isobutylene in reactive contact with the catalyst system for a time sufficient to insure complete polymerization, and thereafter recovering the desired copolymer having a number average molecular weight of from about 1000 to about 4000, a heterogeneity index of from about 1.50 to about 2.25 and a styrene content of from about 40 to about 90 weight per cent with its higher molecular weight fractions having a higher styrene content than the average styrene content of the copolymer.

3,976,608

FILLED THERMOPLASTIC

Ernest Jack Buckler, and Michael Hugh Richmond, both of Sarnia, Canada, assignors to Polysar Limited, Sarnia, Canada

Filed Apr. 15, 1975, Ser. No. 568,328

Claims priority, application Canada, May 7, 1974, 199182

Int. Cl.[2] C08K *5/01;* C08L *1/02, 3/02, 7/00*

U.S. Cl. 260—4 AR 10 Claims

7. A mouldable filled polystyrene product which comprises a mixture of a masterbatch and polystyrene characterized in that said masterbatch comprises 100 parts by weight of an impact polystyrene which contains from 1 to about 15 weight per cent of a rubber selected frm polybutadiene, polyisoprene, thermoplastic rubber block vinylidene aromatic hydrocarbon — conjugated diolefin polymers and ethylene-propylene-diene rubber, from 1 to 40 parts by weight of a polymer of a diolefinic hydrocarbon selected from styrenebutadiene rubbers containing from 17 to 45 weight per cent of bound styrene, a blended product containing an average of from 40 to 60 weight per cent of bound styrene and being a blend of (a) styrene-butadiene rubber containing from 15 to 35 weight per cent of bound sytrene and (b) styrene-butadiene polymer containing from 75 to 95 weight per cent of bound styrene, polybutadiene, high cis-1,4 polyisoprene, natural rubber, thermoplastic rubbery block copolymers comprising vinyl- or vinylidene-substituted aromatic hydrocarbon polymer blocks and conjugated diolefin polymer blocks, and ethylene-propylene-diene rubbers, from 10 to 200 parts by weight of a filler selected from calcium carbonate, magnesium carbonate, calcium sulphate, clay, aluminum silicate, silica, talc, mica, vermiculite, asbestos fibres, glass fibres, particulate starch, wood sawdust, wood flour, glass beads having an average diameter of about 10 to about 60 microns and mixtures thereof, and from 1 parts 40 parts, by weight of a mixed naphthenic-/aromatic or highly aromatic oil, said mixture containing from 5 to 50 parts by weight of said filler per 1.0 parts by weight of said filled polystyrene product.

3,976,609

PROCESS FOR THE PREPARATION OF DISTRIBUTIONS

Hildegard Schnoring, Wuppertal-Elberfeld; Gottfried Pampus; Nikolaus Schon, both of Leverkusen, and Josef Witte, Cologne-Stammheim, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Continuation of Ser. No. 739,154, June 24, 1968, abandoned. This application Mar. 27, 1972, Ser. No. 238,522

Claims priority, application Germany, July 13, 1967, 52942

Int. Cl.[2] C08L *47/00*

U.S. Cl. 260—17 R 7 Claims

1. A stable oil-in-water emulsion wherein the discontinuous phase is a solution of an organic compound having a molecular weight of at least 500 in a water-immiscible organic solvent thereof and constitutes 20 to 80% by volume of the total emulsion and wherein the agent responsible for emulsification consists of from 0.02 to 2% by weight, based on the weight of

water in said emulsion, of a linear polymer, said linear polymer having a molecular weight of the order of $10^6 - 10^8$ and an aqueous solution thereof having a concentration of 0.05% by weight lowering the resistance index in turbulent flow by at least 10%.

3,976,610

ACRYLATE RUBBER VULCANIZABLE COMPOSITIONS

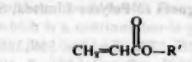
Roger E. Morris, Cuyahoga Falls, and Harold Tucker, Brecksville, both of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio

Continuation-in-part of Ser. No. 453,278, March 21, 1974, Pat. No. 3,912,672, which is a continuation of Ser. No. 272,849, July 18, 1972, abandoned. This application Apr. 14, 1975, Ser. No. 567,938

Int. Cl.² C08F 8/40, 8/42, 220/18, 220/26

U.S. Cl. 260—23 TN 10 Claims

1. A composition comprising (1) an acrylate rubber comprising (a) from about 40 percent to about 99.8 percent by weight of an acrylate or mixtures of acrylates of the formula



wherein R′ is selected from the group consisting of an alkyl radical containing 1 to 18 carbon atoms, an alkoxyalkyl radical, alkylthioalkyl radical, and cyanoalkyl radical each containing a total of 2 to about 12 carbon atoms in the radical, (b) from about 0.1 percent to about 30 percent by weight of a halogen-containing monomer selected from the group consisting of halogen-containing vinylidene hydrocarbons and halogen-containing vinyl monomers wherein the halogen group is at least 2 carbon atoms removed from an oxygen atom, (c) from about 0.1 percent to about 20 percent by weight of a carboxyl-containing monomer, and (d) up to about 35 percent by weight of a non-halogen-containing and non-carboxyl-containing copolymerizable monomer having a terminal vinylidene group, and (2) a cure system consisting essentially of (a) from about 0.5 part to about 7 parts by weight based upon 100 parts by weight of the rubber of an alkali metal salt of an acid selected from the group consisting of carboxylic acids containing 2 to about 24 carbon atoms and organophosphoric acids of the structure

$$(RO)_z - PO_yOM$$

wherein M is an alkali metal, y = 1 or 2, z = 1 or 2, and y + z = 3, and R is selected from the group consisting of an alkyl radical containing 1 to 24 carbon atoms, an aryl radical containing 6 to 24 carbon atoms, and an alkylphenoxy poly(ethyleneoxy)ethyl radical, and (b) from about 0.1 part to about 10 parts by weight based upon 100 parts by weight of the rubber of an amine-blocked isocyanate wherein the amine has a dissociation constant of below 10 and is a secondary amine or guanidine.

3,976,611

FREE-FLOWING BEADS OF PARTICLES OF AN ACRYLATE ELASTOMER

Romeo Raymond Aloia, Bridgewater Township, Somerset County, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed Dec. 9, 1974, Ser. No. 530,788

Int. Cl.² C08L 91/00; C08F 224/00, 220/42, 218/00

U.S. Cl. 260—23 AR 8 Claims

1. In a process for the preparation of an acrylate elastomer by a free radical initiated suspension polymerization system, whereby a major proportion of one or more acrylic acid esters is copolymerized with a minor proportion of one or more vinyl monomers polymerizable therewith, including from about 1 to 10 percent, based on the total weight of monomers, of a monomer containing an active halogen atom or an epoxy group, the improvement consisting essentially of: adding to the reaction mixture of said suspension polymerization system from about 0.5 to 6 parts by weight, based on the total weight of monomers charged, of a divalent metal salt of a C_{12} to C_{20} carbon atom fatty acid as the sole anti-fusing additive, and recovering said acrylate elastomer in the form of free-flowing granules.

6. A dry, free-flowing, granular acrylate elastomer composition consisting essentially of a composition prepared by a free radical initiated aqueous suspension polymerization of a major proportion of one or more esters of acrylic acid and a minor proportion of a vinyl monomer copolymerizable therewith containing an active-halogen atom or an epoxy group, wherein from about 0.5 to 6 percent, based on the weight of polymer particles produced in said polymerization reaction, of a divalent metal salt of a C_{12} to C_{20} fatty acid as the sole anti-fusing additive is incorporated into or onto said polymer particles.

3,976,612

POLYETHYLENE COMPOSITION

Hidehiko Kaji; Takeshi Matsumoto; Norio Sugi; Atsuo Ikenaga; Shoichi Iwata, and Masami Tomikawa, all of Chiba, Japan, assignors to Idemitsu, Kosan Kabushiki-Kaisha (Idemitsu Kosan Co., Ltd.), Tokyo, Japan

Continuation-in-part of Ser. No. 420,076, Nov. 29, 1973, abandoned. This application Feb. 24, 1975, Ser. No. 552,182

Claims priority, application Japan, Nov. 30, 1972, 47-119326

Int. Cl.² C08L 91/00

U.S. Cl. 260—23 R 7 Claims

1. A calendered filled polyethylene sheet material obtained by kneading together under a temperature within the range of about 140°–170°C and then calendering into sheet form a polyethylene resin composition consisting essentially of:

a. a first high density polyethylene having a viscosity-average molecular weight of 10×10^4 to 20×10^4, a number average molecular weight of 1×10^4 or greater and a ratio between weight average molecular weight and a number average molecular weight of 20 or less, and a melt index of about 0.01–0.09;

b. a second high density polyethylene distinct from said first polyethylene (*a*) having a viscosity-average molecular weight of $5–10 \times 10^4$, a number average molecular weight of $0.5–1.0 \times 10^4$ and a melt index of 0.1 to 1.0;

c. at least one inorganic calcium compound having a particle size of about 0.1–10 μ and selected from a group consisting of calcium sulfite, calcium sulfate and calcium carbonate in an amount sufficient to give a weight ratio relative to the aggregate of said polyethylene being 3:7 to 8:2, and

d. about 0.3 to 5.0% by weight of a solid waxy lubricant with respect to the total quantity of (*a*) and (*b*), the second polyethylene (*b*) being present in an amount sufficient to render the composition workable by kneading and calendering up to a ratio of 5:1 relative to said first polyethylene (*a*).

3,976,613

COMPOSITION AND PROCESS FOR TREATING AND REPAIRING METALLIC AND NON-METALLIC SURFACES

Rainer Schinabeck, Scituate, Mass., assignor to American Velodur Metal, Inc., Scituate, Mass.

Filed Mar. 28, 1975, Ser. No. 562,969

Int. Cl.² C08L 63/02

U.S. Cl. 260—29.1 SB 16 Claims

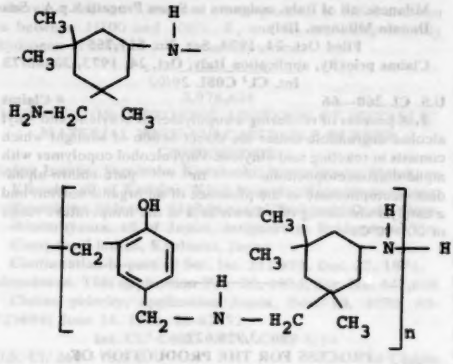
1. A hardenable, liquid film forming composition that is capable of being applied as a uniform coating and hardening to a smooth, tough and adherent coating and possessing good mechanical and solvent resistant properties comprising:

A. a liquid epoxy resin having terminable epoxy groups and an epoxy equivalent from about 185 to 210;

B. a filler material in an amount between about 20 and 50 weight percent of said epoxy resin;

C. an effective amount of a dispersing agent for said filler material; and

D. a hardening additive for said epoxy resin of the structural formula:



wherein *n* has a value of at least 2.

3,976,614

INHERENTLY WATER-DISPERSIBLE, SELFCROSSLINKING INTERPOLYMERS USEFUL AS COATINGS

W. Jay Elms, Midland, Mich., and Dieter H. Klein, Achern, Germany, assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 417,309, March 10, 1969, abandoned. This application Dec. 26, 1974, Ser. No. 536,491

Int. Cl.² C08L *61/20*

U.S. Cl. 260—29.4 UA **12 Claims**

1. An aqueous dispersion of an interpolymer of up to about 40 mole percent of a monovinylidene aromatic monomer, up to about 70 mole percent of an alkyl ester of an α,β-ethylenically unsaturated carboxylic acid, from about 3 to about 80 mole percent of an alkylene glycol monomer selected from the group consisting of an adduct of hydroxyethyl acrylate and three propylene oxides, an adduct of hydroxyethyl acrylate and three butylene oxides, alkylene glycol ether esters of α,β-ethylenically unsaturated monocarboxylic acids and alkylene glycol ethers of ethylenically unsaturated alcohols, from about 2 to about 15 mole percent of an α,β-ethylenically unsaturated carboxylic acid, up to about 50 mole percent of a hydroxyalkyl ester of an α,β-ethylenically unsaturated carboxylic acid and up to about 24 mole percent of another α,β-ethylenically unsaturated monomer, said interpolymer having a molecular weight in the range from about 3,000 to about 100,000, said dispersion being curable under oxidative conditions to form a water-resistant coating.

3,976,615

WATER DISPERSIBLE EPOXY ETHER-AMINOACRYLATE POLYMERS

Kazys Sekmakas, Chicago, Ill., assignor to DeSoto, Inc., Des Plaines, Ill.

Filed Nov. 13, 1974, Ser. No. 523,286

Int. Cl.² C08F *226/02*

U.S. Cl. 260—29.6 HN **20 Claims**

1. A non-gelled, amine-functional polymer dispersible in water with the aid of a solubilizing acid, said polymer being a copolymer of:

A. an unsaturated hydroxy functional polyether formed by etherifying a polyepoxide having a 1,2-epoxy equivalency of from 1.2 to about 2.0 with an ethylenically unsaturated monohydric alcohol to consume substantially all of the epoxy functionality in the production of a polyether containing from about 1.2 to about 2.0 ethylenically unsaturated ether groups per molecule; and

B. copolymerizable monoethylenically unsaturated monomers, a portion of which is amine-functional.

3,976,616

BIS(PHOSPHATE) PLASTICIZERS AND PLASTICIZED COMPOSITIONS

Malcolm Combey, Mellor Stockport, and Raymond Nicolson Birrell, Sale, both of England, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

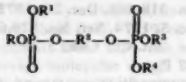
Division of Ser. No. 369,040, June 11, 1973, Pat. No. 3,869,526. This application Dec. 24, 1974, Ser. No. 536,132

Claims priority, application United Kingdom, June 13, 1972, 27501

Int. Cl.² C08K *5/52*; **C08L** *27/06*

U.S. Cl. 260—30.6 R **8 Claims**

1. A composition comprising a vinyl chloride polymer or copolymer and as plasticizer therefor 5 to 100% by weight of the polymer of a bis-phosphate compound of the formula



wherein

the R, R^1, R^3 and R^4 groupings are the same or different and each may be an alkyl radical containing from 1 to 15 carbon atoms, phenyl or alkylphenyl radical of 6 to 15 carbon atoms such that R, R^1, R^3 and R^4 are not all alkyl radicals nor are they all phenyl or alkylphenyl containing 6 to 8 carbon atoms, and

R^2 is a straight, branched or cyclic alkylene containing from 2 to 6 carbon atoms or a mono-, di- or trioxaalkylene of 4 to 20 carbon atoms, or

a mixture of said compounds.

3,976,617

CORROSION INHIBITING SYSTEM CONTAINING ZINC AND ZINC PHOSPHATE

Joseph A. Vasta, Woodbury, N.J., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 252,352, May 11, 1972, abandoned. This application June 13, 1974, Ser. No. 478,967

The portion of the term of this patent subsequent to Jan. 8, 1991, has been disclaimed.

Int. Cl.² C08K *3/08*, *3/32*

U.S. Cl. 260—39 R **4 Claims**

1. In a galvanic action corrosion-inhibiting coating composition suitable for lining the interior surface of a water heater tank, the composition consisting essentially of

a. polyvinylidene fluoride, 5–90% by weight of the binder components;

b. a condensation product of Bisphenol A or Bisphenol F and epichlorohydrin, 5–90% by weight of the binder components;

c. an aminoplast resin, 5–90% by weight of the binder components;

d. particulate zinc, 50–900% by weight of the binder components; and

e. a liquid carrier;

the improvement comprising the presence in the composition of an effective amount of zinc phosphate.

3,976,618

MOLDING MADE OF HYDROLYZED ETHYLENE-VINYL ACETATE COPOLYMER

Hiroshi Takida, Takatsuki, and Yoshimi Akamatu, Amagasaki, both of Japan, assignors to Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed July 30, 1974, Ser. No. 493,648
Claims priority, application Japan, Aug. 14, 1973, 48-91154
Int. Cl.[2] C08K *3/34*
U.S. Cl. 260—40 R 5 Claims

1. A molding composition comprising 95 to 50 % by weight of hydrolyzed ethylene-vinyl acetate copolymer and 5 to 50 % by weight of talc; said hydrolyzed ethylene-vinyl acetate copolymer having an ethylene content of 20 to 50 % by mole, a vinyl acetate content of 80 to 50 % by mole and a degree of hydrolysis in vinyl acetate component of not less than 90 % by mole.

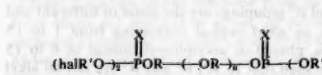
3,976,619

FLAME RETARDANT POLYMERS CONTAINING PHOSPHATES

Albert W. Morgan, Collinsville, Ill., and William Vanderlinde, St. Louis, Mo., assignors to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 318,448, Dec. 26, 1972. This application Dec. 5, 1974, Ser. No. 529,680
Int. Cl.[2] C08J *3/20*
U.S. Cl. 260—45.7 P 9 Claims

1. A polymer composition containing an effective flame retardant amount of a compound of the formula



wherein R represents cycloalkylene or alkylenecycloalkylene of from 5 to about 12 carbon atoms, R′ represents an alkylene group of 2 to 10 carbon atoms, X represents oxygen or sulfur, hal represents chlorine or bromine and *n* represents an integer from 0 to 5.

3,976,620

PHOSPHORUS CONTAINING AMIDES FLAME RETARDANTS

Peter Golborn, Lewiston, and James J. Duffy, Buffalo, both of N.Y., assignors to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Division of Ser. No. 374,826, June 29, 1974, Pat. No. 3,901,650, which is a division of Ser. No. 239,793, March 30, 1972, Pat. No. 3,823,206. This application June 9, 1975, Ser. No. 585,270
Int. Cl.[2] C08J *3/20*
U.S. Cl. 260—45.9 NC 16 Claims

1. An article comprising a resin compound and a flame retardant amount of a compound of the formula

wherein R′ is selected from the group consisting of phenyl, lower alkenyl and halogen substituted and unsubstituted lower alkyl of 1–6 carbon atoms, y is an integer from 1–2 provided that when y is 1, R is selected from the group consisting of hydrogen, lower alkyl of 2–8 carbon atoms, benzyl, lower dialkylphosphonoalkyl and phenoxymethylene and when y is 2, R is lower alkylene of 1–4 carbon atoms.

3,976,621

PHOTODEGRADABLE COPOLYMERS OF ETHYLENE AND VINYL ALCOHOL CONTAINING KETOETHER GROUPS

Nicola Palladino, Monterotondo; Marcello Mazzei, Milan; Paolo Bacchin, Rome, and Walter Marconi, San Donato Milanese, all of Italy, assignors to Snam Progetti S.p.A., San Donato Milanese, Italy

Filed Oct. 24, 1974, Ser. No. 517,755
Claims priority, application Italy, Oct. 24, 1973, 30483/73
Int. Cl.[2] C08L *29/02*
U.S. Cl. 260—66 4 Claims

1. A process of rendering a copolymer of ethylene and vinyl alcohol degradable under the direct action of sunlight which consists in reacting said ethylene-vinyl alcohol copolymer with alpha-diazoacetophenone or para-chloro-alpha-diazoacetophenone in the presence of an organic solvent and a catalyst consisting of a Lewis acid in the temperature range of 20°–90°C.

3,976,622

PROCESS FOR THE PRODUCTION OF POLYISOCYANATES WITH A BIURET STRUCTURE

Kuno Wagner; Johannes Eimer; Joachim Zirner, all of Leverkusen; Rainer Raab, Odenthal, and Dietrich Liebsch, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Division of Ser. No. 441,778, Feb. 12, 1974, Pat. No. 3,903,127. This application May 19, 1975, Ser. No. 578,557
Claims priority, application Germany, Feb. 17, 1973, 2308015
Int. Cl.[2] C08G *18/79*
U.S. Cl. 260—77.5 AT 5 Claims

1. In the production of a polyurethane resin wherein a polyisocyanate is reacted with an active hydrogen containing material, the improvement wherein said polyisocyanate has a biuret structure and a maximum viscosity of 50,000 cP at 20°C. and is produced by a process comprising:

A. reacting (1) excess quantities of an organic diisocyanate having aliphatically bound isocyanate groups with (2) a biuretizing agent selected from the group consisting of water and organic compounds which convert organic isocyanates into the corresponding biurets at elevated temperatures, the substituents of said organic compounds being inert in the biuretization process and not forming a constituent of the biuret, at a temperature of from 60° to 250°C, and

B. removing excess unreacted diisocyanate, said process characterized in that the organic diisocyanate and biuretizing agent are used in proportions corresponding to a molar ratio of diisocyanate to monofunctional biuretizing agent of at least 11:1.

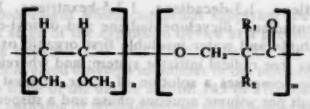
3,976,623

COPOLYMERS OF 1,2-DIMETHOXY-ETHYLENE AND β-LACTONES OR CYCLIC SIX-MEMBERED RING CARBONATES

Norbert Vollkommer, Troisdorf, Germany, assignor to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany

Filed Nov. 8, 1973, Ser. No. 414,618
Claims priority, application Germany, Nov. 15, 1972, 2255890
Int. Cl.[2] C08G *63/02*
U.S. Cl. 260—78.3 UA 17 Claims

1. A copolymer of 1,2-dimethoxyethylene and a β-lactone as a component of the chain, said copolymer having the formula:



wherein *n* and *m* are integers, *n*+*m* equals 10 to 1,000 and *n*/*m* is between 1/100 and 100/1, R_1 and R_2 are independently hydrogen or alkyl of 1 to 4 carbon atoms.

3,976,624

METHOD FOR IMPROVING ADHESION OF METALLIC MATERIAL WITH VULCANIZABLE RUBBER COMPOSITION

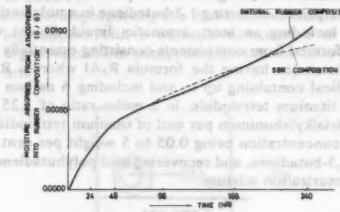
Sakae Inouye; Suminobu Kurahashi; Norio Wada; Motokazu Kikuchi, all of Kodaira; Kinji Masuda, Higashimurayama; Tsuneharu Akiyama, Akishima, and Toshiyuki Osaki, Higashimurayama, all of Japan, assignors to Bridgestone Tire Company Limited, Kyobashi, Japan

Continuation-in-part of Ser. No. 211,971, Dec. 27, 1971, abandoned. This application Feb. 28, 1974, Ser. No. 447,048

Claims priority, application Japan, Dec. 28, 1970, 45-119694; June 16, 1971, 46-42572

Int. Cl.² C08C *19/20*; C08F *8/34*

U.S. Cl. 260—79.5 B 4 Claims



1. A method for improving the adhesion of a rubber composition, containing a sulphur vulcanizer, with copper, brass or other metals coated therewith said method comprising adding at least one compound selected from the group consisting of orthoboric acid, zinc borate, manganese borate, calcium borate, lead borate, cobalt borate and sodium borate to the rubber composition in a ratio of 0.1 to 5 weight parts of said boric acid compound to 100 weight parts of an elastomer in said rubber composition, closely contacting the metal to be coated with the rubber composition containing the boric acid compound and then vulcanizing the resulting rubber composition, whereby said metal adheres to the vulcanized rubber composition.

3,976,625

VULCANIZABLE COMPOSITIONS CONTAINING DIENE/NITRILE POLYMERS HAVING ACTIVE HALOGEN SITES

Philip H. Starmer, Avon Lake, Ohio, assignor to The B.F. Goodrich Company, Akron, Ohio

Filed Dec. 26, 1974, Ser. No. 536,340

Int. Cl.² C08L *9/00*

U.S. Cl. 260—79.5 P 13 Claims

1. A vulcanizable composition comprising (1) a diene/nitrile polymer having a halogen content of from about 0.2 percent to about 5 percent by weight and comprised of interpolymerized units of from 50 percent to about 98 percent by weight of a nonhalogen containing conjugated diene monomer having from 4 to about 10 carbon atoms, from about 15 percent to about 50 percent by weight of a nonhalogen containing monoolefinically unsaturated nitrile monomer having 3 to about 6 carbon atoms, and from about 0.5 percent to about 20 percent by weight of a halogen-containing monomer having a Q value of from about 0.25 to about 3, and (2) a cure system consisting essentially of from about 1 part to about 7 parts by weight of zinc oxide and from about 0.1 part to about 5 parts by weight of a thiourea compound, said parts by weight based upon 100 parts by weight of the polymer.

3,976,626

PRODUCTION OF BINDERS FOR COATING COMPOSITIONS

Ulrich Turck, Marl, Germany, assignor to Chemische Werke Huls Aktiengesellschaft, Marl, Germany

Filed Mar. 28, 1975, Ser. No. 563,188

Claims priority, application Germany, Apr. 4, 1974, 2416481

Int. Cl.² C08F *2/26*, *236/04*, *212/08*

U.S. Cl. 526—78 9 Claims

1. A process for the production of a binder for coating agents wherein the binder is prepared by the polymerization, in the aqueous phase in the presence of an anionic emulsifier, polyethylene oxide and peroxydisulfate and at an elevated temperature, of a monomer mixture consisting by weight of 10–85% of vinyl aromatic component, which may be partially replaced by 0–20% of acrylonitrile, and 15–90% of a diolefin component, 0–6% of α,β-unsaturated carboxylic acid, and 0.–6% of an amide of an α,β-unsaturated carboxylic acid, which comprises employing a reaction mixture which contains at the beginning of the polymerization, by weight, based on the monomer mixture, about 0.05 – 0.5% of an anionic sulfonate or sulfate emulsifier; about 0.5 – 5% of a polyethylene oxide having an average molecular weight of between about 300 and 4,000; and about 0.5 – 2% of a water-soluble peroxydisulfate; and, after a monomer conversion of between about 15 and 35% by weight, adding to the reaction mixture another 0.2 – 1.5% by weight of starting monomer mixture of an anionic sulfonate or sulfate emulsifier.

3,976,627

VULCANIZABLE COMPOSITIONS OF CARBOXYL-CONTAINING POLYMERS

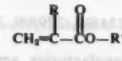
Roger E. Morris, Cuyahoga Falls, Ohio, assignor to The B.F. Goodrich Company, Akron, Ohio

Filed Oct. 4, 1974, Ser. No. 512,126

Int. Cl.² C08F *220/06*

U.S. Cl. 526—14 23 Claims

1. A vulcanizable composition comprising (1) a carboxyl-containing polymer having a weight percent carboxyl content of from about 0.05% to about 63% by weight based on the weight of the polymer and consisting of interpolymerized units of from about 0.1 percent to 100 percent by weight of a carboxyl-containing monomer and up to 99.9 percent by weight of an acrylate monomer(s) of the formula



wherein R is H, $-CH_3$, or $-C_2H_5$, and R′ is selected from the group consisting of an alkyl radical containing 1 to about 24 carbon atoms and an alkoxyalkyl radical containing a total of 2 to about 12 carbon atoms in the radical, and (2) as the only curatives a cure system consisting essentially of (a) from about 0.1 part to about 10 parts by weight of a di- or polyfunctional halide compound containing 2 to about 40 carbon atoms in the molecule and having at least two primary carbon halide groups, (b) from about 0.1 part to about 10 parts by weight of a nitrogen-containing compound selected from the group consisting of (i) a quaternary ammonium salt, (ii) a mono-, di- or polyfunctional tertiary amine or a monofunctional secondary amine, and (iii) a guanidine, and (c) from about 0.1 part to about 15 parts by weight of an acid acceptor selected from the group consisting of (i) metal salts of organic acids and (ii) non-alkali metal oxides and hydroxides, said

parts by weight of the cure system based upon 100 parts by weight of the carboxyl-containing polymer.

3,976,628

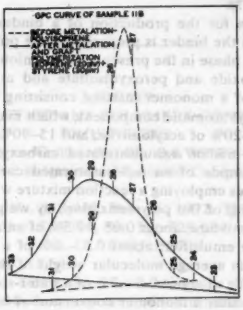
PROCESS FOR POLYLITHIATING UNSATURATED POLYMERS

Adel F. Halasa, Akron, and David P. Tate, Northfield, both of Ohio, assignors to The Firestone Tire & Rubber Company, Akron, Ohio

Continuation of Ser. No. 784,598, Dec. 18, 1968, abandoned, which is a continuation-in-part of Ser. No. 606,011, Dec. 30, 1966, abandoned. This application Jan. 6, 1970, Ser. No. 513

Int. Cl.² C08F 8/32

U.S. Cl. 526—22 15 Claims



1. The method of polylithiating an unsaturated polymer from the class consisting of homopolymers and copolymers containing a plurality of olefinic groups and copolymers which contain conjugated diene groups of 4 to 6 carbon atoms and aryl groups, which method consists of reacting the polymer with a lithiating reagent and bridgehead amine selected from the class consisting of 1-aza(2,2,2) bicyclooctane and 4-methyl and 4-ethyl substituents thereof, triethylene diamine and sparteine, the ration of active lithium atoms in said lithiating reagent to the molecules of said amine being at least 0.01.

3,976,629

PROCESS OF MANUFACTURING SPHERICAL POLYMERIC BEADS

Malcolm Edwin Hayward, East Doncaster, and Volker Elmar Maier, Parkdale, both of Australia, assignors to ICI Australia Limited and Commonwealth Scientific and Industrial Research Organization, both of Melbourne, Australia

Filed Nov. 8, 1974, Ser. No. 522,295

Claims priority, application Australia, Nov. 21, 1973, 5724/73

Int. Cl.² C08F 234/04, 279/00, 200/00, 210/00

U.S. Cl. 526—227 11 Claims

1. A process of manufacturing approximately spherical polymeric beads of average size less than 20 microns, which process comprises copolymerising an unsaturated carboxylic acid and a crosslinking agent characterised in that the polymerisation is initiated by means of a two part redox free radical system and is carried out in a reaction mixture comprising a fine suspension of droplets of an organic phase in an aqueous phase wherein the organic phase comprises an acid chosen from the group consisting of methacrylic acid and crotonic acid; a crosslinking agent chosen from the group consisting of divinyl benzene, divinyl toluene, divinyl xylene, divinyl chlorobenzene, divinyl naphthalene, divinyl ethylbenzene and trivinyl benzene, butadiene, isoprene, dimethallyl, diethallyl, diallyl, cyclopentadiene, piperylene, chloroprene, 2,3-dimethyl-3-butadiene, 2,3-pentadiene, 1,4-pentadiene, 1,5-hexadiene, 2,4-hexadiene, 2,5-dimethyl-2,4-hexadiene, octadiene, 3,7-dimethyl-2,4-octadiene, 2-methyl-6-methylene-2,7-octadiene, 1,3-decadiene, 1,3,5-hexatriene, hexachlorocyclopentadiene, dicyclopentadiene and divinyl-ether, and an oil soluble and water insoluble first organic oxidant part of a redox free radical initiator system; and wherein the aqueous phase comprises a solution of water, at least 15% weight inert salt per volume aqueous phase and a suspending agent which is soluble in water and not salted out of solution by said inert salt; and the second inorganic reductant part of the redox free radical initiator is at least partially soluble in both the organic and the aqueous phase and is added to the reaction mixture during the course of polymerisation while the mixture is maintained at a temperature in the range from 0°C to 50°C.

3,976,630

PROCESS AND CATALYST FOR PRODUCTION OF RUBBERY POLYMERS

David R. Smith, and Robert P. Zelinski, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Continuation-in-part of Ser. No. 541,033, Oct. 17, 1955, abandoned. This application Apr. 16, 1956, Ser. No. 578,166

The portion of the term of this patent subsequent to Apr. 13, 1982, has been disclaimed.

Int. Cl.² C08F 4/64, 36/06

U.S. Cl. 526—335 6 Claims

1. A method for producing rubbery, substantially gel-free polybutadiene containing at least 85 per cent cis 1,4-addition which comprises contacting 1,3-butadiene in a polymerization mixture including an inert, aromatic, liquid diluent with a catalyst formed from components consisting essentially of (a) trialkylaluminum having the formula R_3Al wherein R is an alkyl radical containing up to and including 6 carbon atoms and (b) titanium tetraiodide, in a molar ratio of 1.25 to 50 mols of trialkylaluminum per mol of titanium tetraiodide, the catalyst concentration being 0.05 to 5 weight per cent based on the 1,3-butadiene, and recovering said polybutadiene from the polymerization mixture.

3,976,631

PROCESS FOR PREPARING ETHYLENE POLYMERS

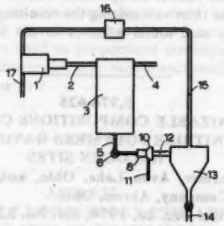
Theodorus J. van der Molen, Geleen; Louis A. Meijer, Stein, and Joos D. Joosen, Geleen, all of Netherlands, assignors to Stamicarbon B.V., Geleen, Netherlands

Filed Apr. 18, 1974, Ser. No. 462,074

Claims priority, application Netherlands, Apr. 18, 1973, 7305415

Int. Cl.² C08F 110/02

U.S. Cl. 526—64 10 Claims



1. In a process for preparing homopolymers or copolymers of ethylene wherein ethylene or a mixture of ethylene with at least one other organic compound capable of forming a copolymer with ethylene is subjected to a high pressure and a high temperature in a reactor in the presence of an initiator or catalyst, in which the mixture of polymer and unconverted monomer discharged out of the reactor is expanded to practically atmospheric pressure with the aid of an expansion device in at least two steps whereby the polymer in the expanded mixture is separated from the mixture in the solid state, the

improvement which comprises supplying the mixture to the last stage of the expansion device at a pressure and temperature between 130° and 250°C such that the enthalpy of the unconverted ethylene monomer in the mixture supplied to the last stage of the device is from 145 to 210 kcal/kg higher than the enthalpy of liquid ethylene at the boiling point of ethylene at a pressure of 1 kg/cm², whereby during expansion in the last stage of the expansion device the polymer passes from the liquid phase to the solid phase in fibrous form.

3,976,632

REACTIVATION OF ORGANOCHROMIUM OLEFIN POLYMERIZATION CATALYST IN PRESENCE OF OXYGEN

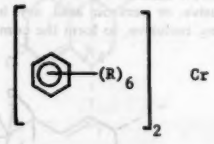
Joseph A. Delap, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Dec. 4, 1974, Ser. No. 529,580
Int. Cl.² C08F 4/02, 4/22
U.S. Cl. 526—113 31 Claims

1. A process for producing a catalyst comprising:

calcining a silica-containing particulate support containing titanium in air at a temperature within the range of 700° to 2000°F;

thereafter impregnating the thus calcined titanium-containing support with a nonaqueous solution of a diarene organochromium compound having the following structure



wherein R is selected from the group consisting of hydrogen and alkyl radicals having from 1 to 6 carbon atoms; and

thereafter treating the thus organochromium-impregnated support in the form of a free flowing powder containing at least 2 weight percent solvent, based on the weight of said impregnated support, with molecular oxygen at a temperature within the range of 40° to 150°F.

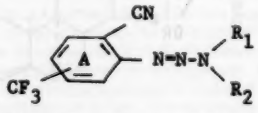
3,976,633

SUBSTITUTED CYANO,TRIFLUOROMETHYLPHENYL LINEAR TRIAZENES

Charles E. Berkoff, Huntingdon Valley; David T. Hill, North Wales, and Bernard Loev, Broomall, all of Pa., assignors to SmithKline Corporation, Philadelphia, Pa.

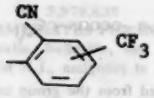
Filed June 3, 1974, Ser. No. 475,699
Int. Cl.² C07C 115/00; A61K 31/655
U.S. Cl. 260—140 R 6 Claims

1. A compound of the formula:



in which:

R_1 is phenyl, 4-carboxyphenyl or



and

R_2 is hydrogen, formyl, α-chloroacetyl, α-bromoacetyl, alkanoyl, alkoxycarbonyl, alkoxycarbonylalkanoyl, carboxyalkanoyl, cyclopentylcarbonyl, cyclohexylcarbonyl, N-alkylcarbamoyl, N,N-dialkylcarbamoyl, N-phenylcarbamoyl, N-alkoxycarbonylcarbamoyl, or N,N-dialkylaminoalkanoyl, said alkyl and alkoxy having from one to four carbon atoms and said alkanoyl having from two to five carbon atoms.

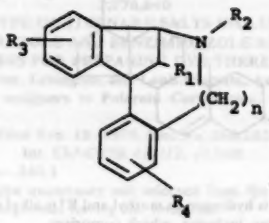
3,976,634

SUBSTITUTED 7,12-METHANO DIBENZAZOCINES AND 8,13-METHANO DIBENZAZONINES

Jeffrey Nadelson, Lake Parsippany, and William J. Houlihan, Mountain Lakes, both of N.J., assignors to Sandoz, Inc., East Hanover, N.J.

Filed Mar. 25, 1974, Ser. No. 454,269
Int. Cl.² C07D 223/14, 223/16
U.S. Cl. 260—239 BB 11 Claims

1. A compound of the formula:



where

n is 1 or 2;

R_1 is having alkyl havin 1 to 4 carbon atom

R_2 is hydrogen or lower alkyl having 1 to 4 carbon atoms and

R_3 and R_4 each independently is hydrogen, halo having an atomic weight of about 19 to 35, lower alkyl having 1 to 4 carbon atoms or lower alkoxy having 1 to 4 carbon atoms or

a pharmaceutically acceptable acid addition salt thereof.

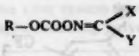
3,976,635

NOVEL ESTERIFYING AGENTS, AND THEIR PRODUCTION AND USE

Masumi Itoh, Cleveland Heights, Ohio, assignor to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

Division of Ser. No. 279,086, Aug. 9, 1972, Pat. No. 3,832,375.
This application June 10, 1974, Ser. No. 477,682
Claims priority, application Japan, Aug. 13, 1971, 46-61820; Oct. 7, 1971, 46-79295
Int. Cl.² C07C 67/02, 69/02
U.S. Cl. 260—239.1 3 Claims

1. A process for the esterification of organic carboxylic acids which comprises reacting an organic carboxylic acid with a carbonic acid ester of the formula:



wherein R is selected from the group consisting of a lower alkyl group, a halo (lower) alkyl group, a lower alkenyl group, an aryl group, a haloaryl group, a nitroaryl group and an ar (lower) alkyl group, X is a cyano group or a lower alkoxycarbonyl group and Y is a carbamoyl group or a lower alkoxycarbonyl group, in the presence of an organic and/or inorganic base to esterify the carboxyl group in the organic carboxylic acid.

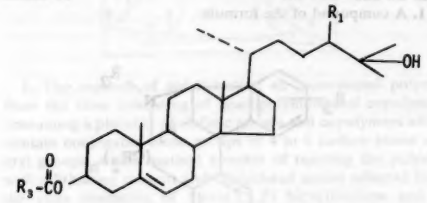
3,976,636

PROCESS AND COMPOUNDS

William G. Salmond, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

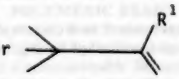
Filed Oct. 10, 1974, Ser. No. 513,760
Int. Cl.[2] C07J 71/00
U.S. Cl. 260—239.55 R 17 Claims

1. A method of preparing compounds selected from the group consisting of

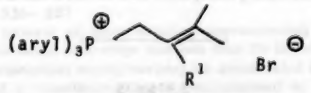


wherein R^1 is hydrogen or methyl and R^2 is alkyl of one to five carbon atoms, inclusive, which comprises

a. reacting an aryl Wittig reagent with

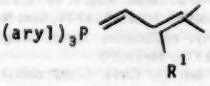


wherein R^1 is hydrogen or methyl, to form the phosphonium salt



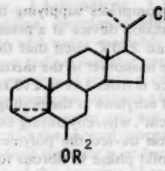
wherein R^1 is hydrogen or methyl

b. converting the phosphonium salt to the ylide

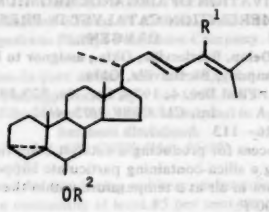


wherein R^1 is hydrogen or methyl

c. condensing the ylide of Step *b* with 3α,5α-cyclo-6β-alkoxybisnorcholanaldehyde

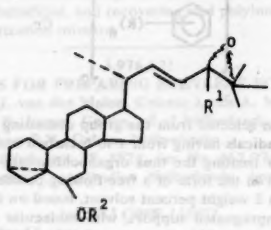


wherein R^2 is alkyl of one to six carbon atoms, inclusive, to form the compound



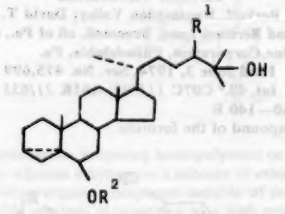
wherein R^1 and R^2 are as defined above;

d. selectively epoxidizing the compound formed in Step *c* with peralkanoic acid having alkyl of one to four carbon atoms, inclusive, or peraroic acid, aryl having six to 10 carbon atoms, inclusive, to form the compound



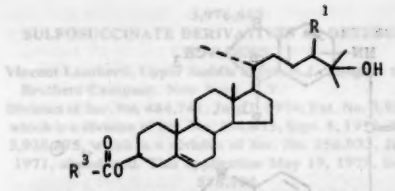
R^1 and R^2 as defined above;

e. catalytically hydrogenating the unsaturated epoxide formed in Step *d* with a noble metal catalyst to form



wherein R^1 and R^2 are as defined above, and

f. reversing the i-ether of Step *e* with alkanoic acid, said alkyl having one to five carbon atoms, inclusive to form



wherein R^1 is as defined above, and R^3 is alkyl of one to five carbon atoms, inclusive.

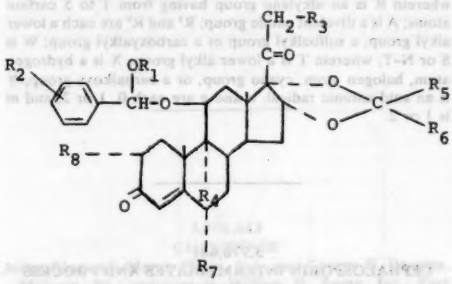
3,976,637

3,20-DIKETOPREGNENES HAVING AN 11β-ACETAL GROUP

Ravi K. Varma, Belle Mead, and Christopher M. Cimarusti, Hamilton, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Sept. 8, 1975, Ser. No. 610,955
Int. Cl.² C07J 17/00
U.S. Cl. 260—239.55 D 15 Claims

1. A steroid having the formula



or a 1,2- or 6,7-dehydro derivative thereof, wherein R_1 is alkyl; R_2 is hydrogen, alkyl, alkoxy, or halogen; R_3 is hydrogen, acyloxy, halogen, or hydroxy; R_4 is hydrogen or halogen; R_5 is hydrogen, alkyl, or aryl; R_6 is alkyl or aryl; R_7 is hydrogen, fluorine, or methyl; and R_8 is hydrogen, chlorine, or methyl.

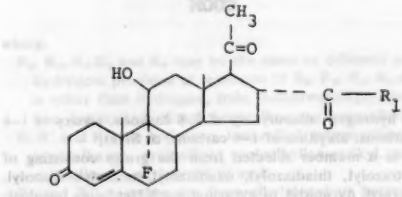
3,976,638

16α-ARYLCARBONYLPREGNENES

Ravi K. Varma, Belle Mead, and Christopher M. Cimarusti, Hamilton, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Oct. 29, 1975, Ser. No. 626,947
Int. Cl.² C07J 33/00
U.S. Cl. 260—239.55 R 9 Claims

1. A steroid having the formula



and the 1,2-dehydro derivatives thereof, wherein R_1 is phenyl, naphthyl, or phenyl or naphthyl substituted with 1 or 2 alkyl, alkoxy, halogen or dialkylamino groups.

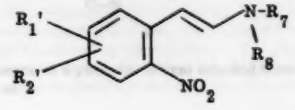
3,976,639

INTERMEDIATES FOR INDOLES

Andrew David Batcho, Belleville, and Willy Leimgruber, Montclair, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Continuation of Ser. No. 260,021, May 31, 1972, abandoned, which is a division of Ser. No. 86,953, Nov. 4, 1970, Pat. No. 3,732,245, which is a continuation-in-part of Ser. No. 879,619, Nov. 24, 1969, abandoned. This application Mar. 31, 1975, Ser. No. 563,557
Int. Cl.² C07D 211/26
U.S. Cl. 260—240 D 14 Claims

1. A compound of the formula



wherein R_1' is hydrogen, lower alkoxy, formyl, phenyl-lower alkoxy, halogen or di-lower alkoxymethyl, R_2' is lower alkoxy, formyl, phenyl-lower alkoxy, halogen or di-lower alkoxymethyl, and when taken together, R_1' and R_2' are methylenedioxy; R_7 and R_8, independently, are lower alkyl, and when taken together, are piperidino or pyrrolidino.

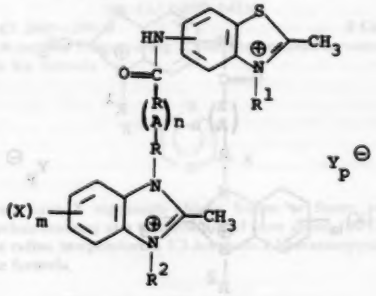
3,976,640

BIS-TYPE QUATERNARY SALTS INCLUDING BENZOTHIAZOLE AND BENZIMIDAZOLE RINGS AND PROCESS FOR PREPARING DYE THEREWITH

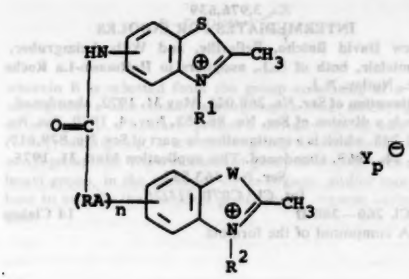
Alan L. Borror, Lexington, and Louis Ciacotta, Andover, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Feb. 18, 1975, Ser. No. 550,182
Int. Cl.² C07D 417/12, 417/06
U.S. Cl. 260—240.1 10 Claims

1. A bis-type quaternary salt selected from the group consisting of compounds having the formulae:



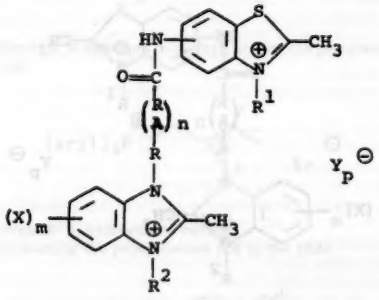
and



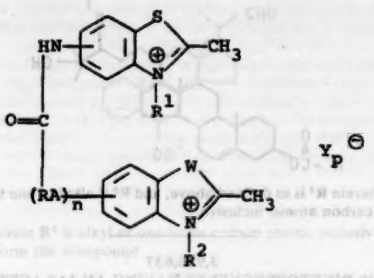
wherein R is an alkylene group having from 1 to 5 carbon atoms; A is a divalent amide group; R^1 and R^2 are each a lower alkyl group, a sulfoalkyl group or a carboxyalkyl group; W is S or N–T, wherein T is a lower alkyl group; X is a hydrogen atom, halogen atom, cyano group, or a carbalkoxy group; Y is an acid anionic radical; *n* and *p* are each 0, 1 or 2; and *m* is 1 or 2.

5. In a process for forming cyanine dyes and related compounds wherein a first heterocyclic quaternary salt intermediate having at least one reactive methyl group is condensed in the presence of a basic condensing agent with at least a second heterocyclic intermediate having a reactive group capable of dye condensation with said reactive methyl group, the improvement which comprises:

condensing said second heterocyclic intermediate with a bis-type quaternary salt selected from the group consisting of compounds having the formulae:



and



wherein R is an alkylene group having from 1 to 5 carbon atoms; A is a divalent amide group; R^1 and R^2 are each a lower alkyl group, a sulfoalkyl group or a carboxyalkyl group; W is S or N–T, wherein T is a lower alkyl group; X is a hydrogen atom, halogen atom, cyano group, or a carbalkoxy group; Y is an acid anionic radical; *n* and *p* are each 0, 1 or 2; and *m* is 1 or 2.

3,976,641

CEPHALOSPORIN INTERMEDIATES AND PROCESS THEREFOR

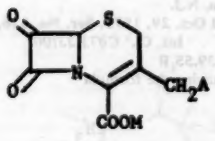
John R. E. Hoover, Glenside, and Timothy Yu-Wen Jen, Broomall, both of Pa., assignors to SmithKline Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 414,008, Nov. 8, 1973, abandoned. This application Nov. 14, 1974, Ser. No. 523,769

Int. Cl.² C07D *279/08*

U.S. Cl. 260—243 R **9 Claims**

1. A compound of the formula



where

A is hydrogen, alkanoyloxy of 2–8 carbons, alkoxy of 1–4 carbons, alkylthio of 1–4 carbons, or SHet;

Het is a member selected from the group consisting of tetrazolyl, thiadiazolyl, oxadiazolyl, triazolyl, diazolyl, pyridyl, pyrimidyl, or pyrazinyl, each Het being unsubstituted or substituted with one or two alkyl groups of 1–6 carbons; and

M is hydrogen or an easily removable protecting ester group.

3,976,642
SULFOSUCCINATE DERIVATIVES AS DETERGENT BUILDERS

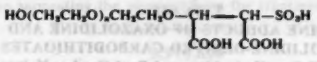
Vincent Lamberti, Upper Saddle River, N.J., assignor to Lever Brothers Company, New York, N.Y.

Division of Ser. No. 484,741, July 1, 1974, Pat. No. 3,922,271, which is a division of Ser. No. 394,613, Sept. 5, 1973, Pat. No. 3,925,375, which is a division of Ser. No. 156,933, June 25, 1971, abandoned. This application May 19, 1975, Ser. No. 578,704

Int. Cl.² C07D *295/00*; **C07C** *143/00*

U.S. Cl. 260—247.1 E **5 Claims**

1. An α-hydroxypolyethyleneoxy-β-sulfosuccinic acid having the general formula:



or the alkali metal, ammonium, monoethanolammonium, diethanolammonium, triethanolammonium, methylammonium, dimethylammonium, trimethylammonium, tetramethylammonium, morpholinium, N-methylmonoethanolammonium and N-ethylmonoethanolammonium salts thereof, wherein n is an integer from 1 to 15.

3,976,643
GUANIDINES

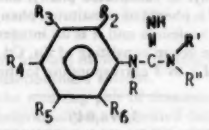
Julius Diamond, Morris Plains, N.J., and George H. Douglas, Malvern, Pa., assignors to William H. Rorer, Inc., Fort Washington, Pa.

Continuation of Ser. No. 379,085, July 13, 1973, Pat. No. 3,914,306, which is a continuation-in-part of Ser. No. 291,474, Sept. 22, 1972, abandoned. This application Feb. 20, 1975, Ser. No. 551,571

Int. Cl.² C07C *129/08*

U.S. Cl. 260—247.5 R **2 Claims**

1. A process for the preparations of a guanidine compound of the formula:



where:

R_2, R_3, R_4,R_5 and R_6 may be the same or different and are hydrogen, provided at least one of R_2, R_3, R_4, R_5 and R_6 is other than hydrogen, halo, haloloweralkyl, nitro, cyano, loweralkylsulfonyl, loweralkoxy or loweralkyl,

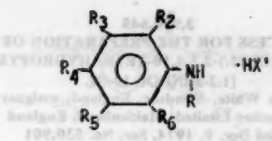
R, R′ and R″ are hydrogen, loweralkyl, intermediate alkyl, loweralkenyl, cycloalkyl, cycloalkylloweralkyl, aralkyl, cycloalkenyl, acyl, aroyl or aryl;

R′ and R″ together are loweralkylidenyl or heteroloweralkylidenyl; and

the non-toxic acid addition salts thereof;

which comprises:

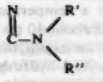
intimately contacting a substituted aniline of the formula:



where

R_2, R_3, R_4, R_5 and R_6 are as described above and HX′ is the salt of a mineral acid;

with a cyanamide of the formula:



in the presence of a phenolic solvent selected from the group consisting of:

phenol,

cresol and

xylenol;

at temperatures from about 25°C to 150°C and isolating said guanidine.

3,976,644
METHOD FOR PREPARING 2,5-DIHALOPYRAZINES

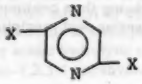
Stanley D. McGregor, and Herman O. Senkbeil, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Dec. 27, 1974, Ser. No. 537,056

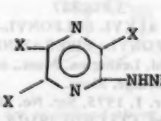
Int. Cl.² C07D *241/46*

U.S. Cl. 260—250 B **3 Claims**

1. A method for preparing 2,5-dihalopyrazines corresponding to the formula



wherein each X represents chloro, bromo or fluoro which comprises reacting at a temperature of from about 100°C. up to the reflux temperature a 3,5,6-trihalo-2-hydrazinopyrazine of the formula



with an aqueous alkali metal hydroxide in the presence of a hydroxylic reaction medium which boils above 100°C.

3,976,645
PROCESS FOR THE PREPARATION OF 10-(HALOPHENYL)-2,3,4,10-TETRAHYDROPYRIMIDO-[1,2-a]INDOL-10-OL

Alan Chapman White, Windsor, England, assignor to John Wyeth & Brother Limited, Maidenhead, England

Filed Dec. 9, 1974, Ser. No. 530,901

Claims priority, application United Kingdom, Dec. 20, 1973, 59064/73; Mar. 5, 1974, 9761/74

Int. Cl.² C07D *487/04*

U.S. Cl. 260—251 A **2 Claims**

1. A process for the preparation of a 10-(m-halophenyl)-2,3,4,10-tetrahydropyrimido[1,2-a]indol-10-ol comprising

a. hydrogenating a 3-(m-halophenyl-1-(2-cyanoethyl)-3-hydroxyindol-2-one at a temperature of about 40° to 50°C. and a pressure of about 40 p.s.i., in the presence of a nickel catalyst and ammonia to give a 1-(3-aminopropyl)-3-(m-halophenyl)-3-hydroxyindol-2-one, and

b. heating a 1-(3-aminopropyl)-3-(m-halophenyl)-3-hydroxyindol-2-one in an inert organic solvent to give the 10-(m-halophenyl)-2,3,4,10-tetrahydropyrimido-[1,2-a]indol-10-ol.

3,976,646
PROCESS FOR PREPARING EQUIMOLECULAR SALT OF PIPERAZINE AND 1,2-DIPHENYL-4-BUTYL-3,5-DIOXO PYRAZOLIDINE

Camille Beaudet, Brussels, Belgium, assignor to Societe d'Etudes et de Realisations Scientifiques en Abrege, Brussels, Belgium

Continuation-in-part of Ser. No. 260,950, June 8, 1972, abandoned. This application Nov. 20, 1974, Ser. No. 525,709

Claims priority, application United Kingdom, June 10, 1971, 19881/71

Int. Cl.² C07D *403/00*, *403/04*

U.S. Cl. 260—268 H **3 Claims**

1. A process for preparing the equimolecular salt of piperazine and 1,2-diphenyl-4-butyl-3,5-dioxo pyrazolidine, in which a solution of 1,2-diphenyl-4-butyl-3,5-dioxo pyrazolidine in an organic solvent selected from acetone, tetrahydrofuran, dioxane, toluene and the chlorinated aliphatic hydrocarbons of the formula $C_xH_yCl_z$, in which $x = 1, 2$ or 3, $y = 0$ to 6 inclusive and $z = 1$ to 6 inclusive, is poured into a solution of an excess of piperazine in the same organic solvent, the obtained mixture is stirred and seed crystals of the desired equimolecular salt are added to the stirred reaction mixture when this mixture is at a temperature at which the seed crystals do not become dissolved in said mixture and at which no precipitation has been initiated in said mixture, the stirring of the reaction mixture being then continued until a precipitate is obtained, and recovering said precipitate.

3,976,647
N-(LOWER ALKYL SULFONYL-METHYL SULFONYL)-PIPERAZINES

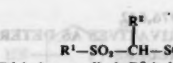
Richard B. Greenwald, Lexington, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Apr. 1, 1975, Ser. No. 564,166

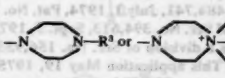
Int. Cl.² C07D *295/18*

U.S. Cl. 260—268 S **11 Claims**

1. A compound of the formula:



wherein R^1 is lower alkyl; R^2 is hydrogen or lower alkyl;



wherein A is a halide of a sulfonate; wherein R^3 is hydrogen or $-(CH_2)_n-Y$ wherein n is a whole number 1 to 4; Y is hydrogen, —OH or —COOR wherein R is hydrogen or lower alkyl; R^4 is $-(CH_2)_n-Y$ wherein n and Y have the same meaning given above and R^5 is lower alkyl.

3,976,648
PYRIDINE ADDUCTS OF OXAZOLIDINE AND THIAZOLIDINE-DERIVED CARBODITHIOATES

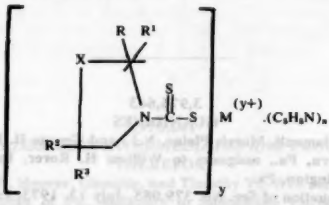
Ivan Christoff Popoff, Ambler, and Paul Gordon Haines, Lafayette Hill, both of Pa., assignors to Pennwalt Corporation, Philadelphia, Pa.

Division of Ser. No. 438,819, Feb. 1, 1974, Pat. No. 3,943,143, which is a continuation-in-part of Ser. No. 356,034, April 30, 1973, abandoned, which is a continuation-in-part of Ser. No. 259,900, June 5, 1972, abandoned, which is a continuation-in-part of Ser. No. 116,250, Feb. 17, 1971, Pat. No. 3,674,701. This application Jan. 24, 1975, Ser. No. 543,746

Int. Cl.² C07D *417/02*, *413/02*

U.S. Cl. 260—270 PY **15 Claims**

1. A compound of the structure



where X is sulfur or oxygen, R, R^1, R^2 and R^3 are independently selected from the group consisting of hydrogen, lower alkyl having from 1 to 8 carbon atoms, CCl_3, phenyl and substituted phenyl wherein there are not more than two substituents selected from the group consisting of NR^4R^5, OH, OR^6 and Cl where R^4 and R^5 are independently selected from the group consisting of hydrogen and methyl, R^6 is a lower alkyl having from 1 to 8 carbon atoms, not more than one of R and R^1 is phenyl or substituted phenyl and not more than one of R^2 and R^3 is phenyl or substituted phenyl; C_5H_5N represents a pyridine molecule and n is an integer of 1 to 3; M is selected from the group consisting of Zn, Cd, Cu and Fe; and y is an integer of 1 to 3 corresponding to the valency of M.

3,976,649
PRODUCTION OF EASILY DISPERSIBLE, HIGH TINCTORIAL STRENGTH PERYLENE-3,4,9,10-TETRACARBOXYLIC ACID DIIMIDES

Wolfgang Fabian, Wilhelmsfeld, and Klaus Schrempp, Ludwigshafen, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Apr. 1, 1974, Ser. No. 456,908

Claims priority, application Germany, Apr. 3, 1973, 2316536

Int. Cl.² C07D *471/06*

U.S. Cl. 260—281 P **6 Claims**

1. In a process for the production in pigmentary form of perylene-3,4,9,10-tetracarboxylic acid diimide or the corresponding N-alkyl diimides of one to four carbon atoms in each alkyl, the improvement for producing a pigment which has

high tinctorial strength and is easily dispersible which comprises the steps of:

grinding the crude pigment until the mean primary particle size is not more than 0.05 micron;

introducing the ground material into a treatment medium which consists essentially of an aliphatic primary amine selected from the group consisting of ethylamine, n-propylamine, n-butylamine, n-hexylamine, ethanolamine, 1-aminopropanol, 3-aminopropanol, β-methoxyethylamine, β-ethoxyethylamine, β-butoxyethylamine, γ-methoxypropylamine, γ-ethoxypropylamine, γ-butoxypropylamine or a mixture of the same;

mixing the ground pigment in said medium at a temperature of from ambient temperature to 160°C until the pigment has recrystallized; and

then separating the pigment from the treatment medium.

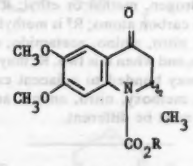
3,976,650

PROCESS FOR PREPARING OPTICALLY ACTIVE 6,7-DIMETHOXY-2-METHYL-4-OXO-1,2,3,4-TETRAHYDRO-1-QUINOLINE CARBOXYLIC ACID ESTER ANALGESICS

Michael R. Johnson, Gales Ferry, Conn., assignor to Pfizer Inc., New York, N.Y.

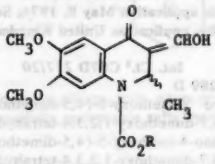
Filed Nov. 4, 1975, Ser. No. 628,778
Int. Cl.² C07D 215/12
U.S. Cl. 260—287 K 5 Claims

1. A process for the preparation of the dextrorotatory enantiomer of a compound of the formula



wherein R is selected from the group consisting of alkyl having one to four carbon atoms and benzyl, which comprises the consecutive steps of

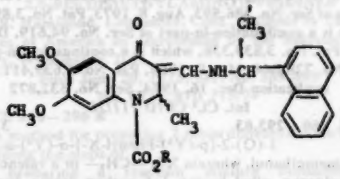
1. contacting a racemic mixture of a compound of the formula



with an equivalent amount of dextrorotatory 1-(1-naphthyl)ethylamine in a reaction-inert solvent,

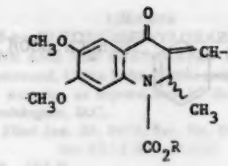
2. separating the resulting pair of diasteriomers,

3. contacting individually the separated diasteriomers of the formula



with at least one equivalent of ammonium acetate in an alkanol having one to three carbon atoms, and

4. hydrolyzing individually the resulting isomers of a compound of the formula



with one equivalent of a alkali metal of alkaline-earth metal hydroxide in an aqueous-alkanol solvent system, said alkanol having from one to three carbon atoms.

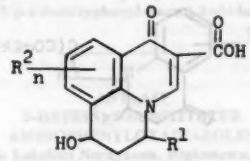
3,976,651

7-HYDROXY-BENZO[ij]QUINOLIZINE-2-CARBOXYLIC ACIDS, INTERMEDIATES, AND A METHOD FOR THEIR PRODUCTION

John F. Gerster, and Charles M. Leir, both of Woodbury, Minn., assignors to Riker Laboratories, Inc., Northridge, Calif.

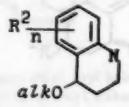
Filed Apr. 14, 1975, Ser. No. 567,494
Int. Cl.² C07D 455/02
U.S. Cl. 260—287 P 7 Claims

1. Process for making carboxylic acids of the formula

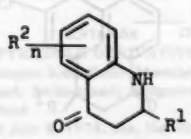


wherein R^1 is hydrogen, methyl or ethyl; R^2 is methyl, ethyl, methoxy, halogen, hydroxy, nitro, amino, acetamido, or formamido; n is zero, one or two, and when n is two, R^2 may be methylenedioxy or ethylenedioxy bonded to adjacent carbon atoms; and when R^2 is ethyl, methoxy, nitro, amino, acetamido or formamido, and n is two, each R^2 must be different; which comprises the steps of:

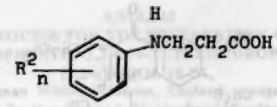
1. reacting a alkoxyquinoline of the formula



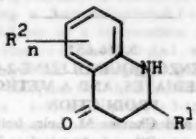
wherein R^2 and n are as defined above, and alk is alkyl having 1 to 4 carbon atoms, with methyl or ethyl lithium under dry conditions in an inert solvent at a temperature between −30° and 0° C, followed by acidic hydrolytic cleavage of the alkoxy group to form a 4-oxo-1,2,3,4-tetrahydroquinoline intermediate of the formula



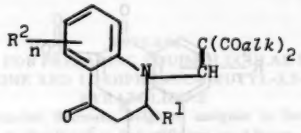
wherein R^2 and n are as defined above, and R^1 is methyl or ethyl, or alternatively, reacting a 2-anilinopropionic acid of the formula



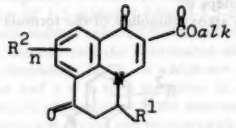
wherein R^2 and *n* are as defined above with polyphosphoric acid at a temperature of 110° to 130° C. to produce a 4-oxo-1,2,3,4-tetrahydroquinoline intermediate of the formula



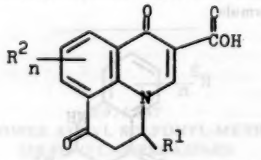
wherein R^1 is hydrogen, and R^2 and n are as defined above; (2) reacting the product of step 1 with a dialkyl alkoxymethylene malonate at a temperature of 130° to 200°C. to effect condensation of the reactants to form an N-substituted tetrahydroquinoline intermediate of the formula



wherein R^1, R^2, n and alk are as defined above; (3) condensing the produce of step 2 at a temperature of 100 to 140°C. in the presence of polyphosphoric acid to form an alkyl 1,7-dioxo-benzo [ij]quinolizine-2-caboxylate intermediate of the formula

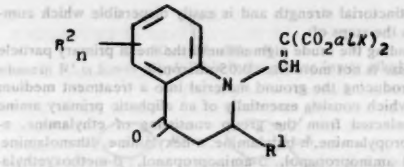


wherein R^1, R^2, n and alk are as defined above; and (4) saponifying the product of step 3 to form a 1,7-dioxo-benzo[ij]-quinolizine-2-carboxylic acid intermediate of the formula



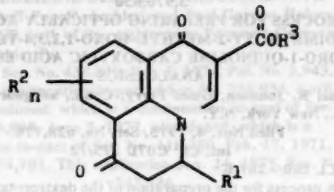
wherein R^1, R^2, and alk are as defined above; (5) reducing the product of step 4 with a selective metal hydride to form the final product.

2. A compound of the formula



wherein R^1 is hydrogen, methyl or ethyl; alk is alkyl having 1 to 4 carbon atoms; R^2 is methyl, ethyl, methoxy, halogen, hydroxy, nitro, amino, acetamido or formamido; n is zero, one or two; and when *n* is two, R^2 may be methylenedioxy or ethylenedioxy bonded to adjacent carbon atoms; and when R^2 is ethyl, methoxy, nitro, amino, acetamido or formamido, and *n* is two, each R^2 must be different.

3. A compound of the formula



wherein R^1 is hydrogen, methyl or ethyl; R^3 is hydrogen or alkyl having 1 to 4 carbon atoms; R^2 is methyl, ethyl, methoxy, halogen, hydroxy, nitro, amino, acetamido, or formamido; n is zero, one or two, and when n is two, R^2 may be methylenedioxy or ethylenedioxy bonded to adjacent carbon atom; and when R^2 is ethyl, methoxy, nitro, amino, acetamido or formamido, each R^2 must be different.

3,976,652

ISOQUINOLINE COMPOUNDS

S. Morris Kupchan, and Andris J. Liepa, both of Charlottesville, Va., assignors to Research Corporation, New York, N.Y.

Division of Ser. No. 257,215, May 26, 1972, Pat. No. 3,875,167. This application May 8, 1974, Ser. No. 467,986

Claims priority, application United Kingdom, Dec. 7, 1971, 56767/71

Int. Cl.² C07D *217/20*

U.S. Cl. 260—289 D **2 Claims**

1. 1-[2-Nitro 4-methoxy-5-(4,5-dimethoxy)phenoxybenzyl]-2-methyl-6,7-dimethoxy-1,2,3,4-tetrahydroisoquinoline.

2. 1-[2-amino-4-methoxy-5-(4,5-dimethoxy)phenoxybenzyl]-2-methyl-6,7-dimethoxy-1,2,3,4-tetrahydroisoquinoline.

3,976,653

3-PIPERIDINE-METHANOLS

Noel F. Albertson, Schodack, and William F. Michne, Colonie, both of N.Y., assignors to Sterling Drug Inc., New York, N.Y.

Division of Ser. No. 386,593, Aug. 8, 1973, Pat. No. 3,898,235, which is a continuation-in-part of Ser. No. 94,619, Dec. 2, 1970, Pat. No. 3,839,338, which is a continuation-in-part of Ser. No. 728,044, May 9, 1968, Pat. No. 3,639,411. This application Dec. 16, 1974, Ser. No. 532,872

Int. Cl.² C07D *211/20*

U.S. Cl. 260—293.83 **3 Claims**

1. 1-(Q)-2-[p-(Y^5)-Phenyl-X-]-α-(Y^3)-α-(Y^4)-3-piperidinemethanol, wherein X is $—CH_2—$ or a valence bond, Q is hydrogen, alkyl having 1–6 carbon atoms, benzyl, p-nitrophenyl, acetyl, carbethoxy, benzyloxycarbonyl, p-toluenesulfonyl, or p-nitrobenzenesulfonyl; Y^3 and Y^4 are the same or different and are hydrogen, alkyl having 1–4 carbon atoms, or phenyl; and Y^5 is hydrogen, alkyl having 1–4 car-

bons, halo, trifluoromethyl, or alkoxy having 1–4 carbon atoms.

3,976,654

2-SUBSTITUTED-1,2,4-THIADIAZOLO-[2,3-a]-BENZIMIDAZOLES AND PROCESS FOR THEIR PREPARATION

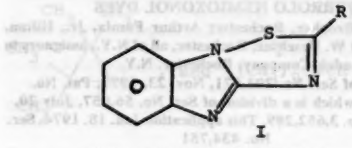
Colin C. Beard, Palo Alto, Calif., assignor to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Division of Ser. No. 523,765, Nov. 14, 1974, Pat. No. 3,846,031, which is a division of Ser. No. 403,474, Oct. 4, 1973, Pat. No. 3,880,874. This application Oct. 16, 1975, Ser. No. 622,932

Int. Cl.² C07D *213/34*

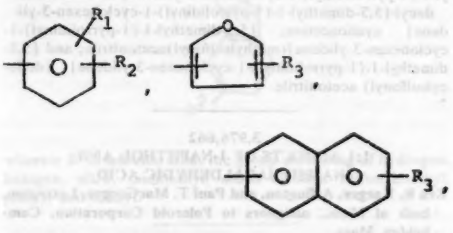
U.S. Cl. 260—294.8 B 5 Claims

1. A compound represented by the formula:



I

wherein R is



in which

R_3 is hydrogen, lower alkoxy, halo, nitro, or lower alkyl; and the pharmaceutically acceptable salts thereof.

3,976,655

METHOD OF MAKING 2,6-BIS(METHYLAMINO) OR 2,6-BIS(DIMETHYLAMINO)PYRIDINES

Peter R. Hammond, Livermore, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed June 20, 1975, Ser. No. 589,489

Int. Cl.² C07D *213/74*

U.S. Cl. 260—296 R 2 Claims

1. A method for preparing 2,6-bis(dimethylamino)pyridine comprising the steps of:

A. preparing a reaction mixture containing 2,6-dichloropyridine, aqueous dimethylamine and copper sulfate;

B. confining said reaction mixture in a bomb; and

C. heating said confined reaction mixture at a temperature of 160°C for 15 hours.

3,976,656

1,4-BIS(5-p-n-BUTOXYPHENYLOXAZOL-2-YL)BENZENE AND THE PREPARAION THEREOF

Peter R. Hammond, China Lake, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 20, 1975, Ser. No. 542,151

Int. Cl.² C07D *263/32*

U.S. Cl. 260—307 R 2 Claims

1. The chemical compound: 1,4-bis(5-p-n-butoxyphenyloxazol-2-yl)-benzene.

2. A method for preparing 1,4-bis(5-p-n-butoxyphenyloxazol-2-yl)-benzene comprising the steps of:

a. reacting p-n butoxyacetophenone in solution with bromine stirred in slowly at room temperature to form p-n-butoxyphenacyl bromide;

b. reacting at room temperature said bromide in solution with hexamethylene tetramine in chloroform to form a quaternary salt of p-n-butoxyphenacyl bromide which is precipitated by stirring the solution into ether;

c. reacting said quaternary salt with hychochoric acid at room temperature to form after standing p-n-butoxy-phenacylammonium chloride which is precipitated by stirring the solution into ether;

d. refluxing said chloride with terephthaloyl chloride in pyridine and chilling to form N,N′ di-p-n-butoxy-phenacylterephthalimide; and

e. refluxing said imide with phosphoryl chloride to form said 1,4-bis(5-p-n-butoxyphenyl-oxazol-2-yl)-benzene.

3,976,657

3-HETERO-5-SUBSTITUTED AMINOPHENYLOXADIAZOLES

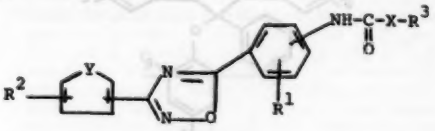
Venkatachala Lakshmi Narayanan, Hightstown, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Mar. 17, 1975, Ser. No. 559,181

Int. Cl.² C07D *271/06*

U.S. Cl. 260—307 G 17 Claims

1. A compound having the formula



wherein R^1 is hydrogen, alkyl, aryl halo, alkoxy or aryloxy; R^2 is hydrogen or methyl; R^3 is alkyl, haloalkyl, cycloalkyl or aryl; X is oxygen or sulfur; and Y is oxygen, sulfur or =NH; wherein the terms alkyl and alkoxy refer to groups having 1 to 7 carbon atoms; the term cycloalkyl refers to groups having 3 to 6 carbon atoms; and the term aryl refers to phenyl or phenyl monosubstituted with a halo, alkyl or alkoxy group, wherein alkyl and alkoxy are defined as above.

3,976,658

PYRAZOLE DERIVATIVES

Lajos Avar, Binningen; Kurt Hofer, Muncheustein, and Martin Preiswerk, Basel, Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

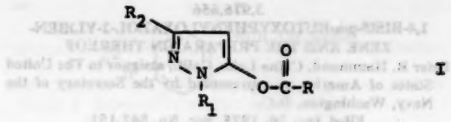
Filed July 8, 1974, Ser. No. 486,345

Claims priority, application Switzerland, July 13, 1973, 10248/73

Int. Cl.² C07D *231/20*, *231/22*

U.S. Cl. 260—310 R 5 Claims

1. A compound of the formula I,



I

wherein

R_1 and R_2, independently, are C_{1-4} alkyl or unsubstituted phenyl, and

R is phenyl monosubstituted in the ortho- or para-position by a hydroxy group and mono- or disubstituted in the meta-position(s) by a tertiary butyl group, wherein the tertiary butyl group or at least one of the two tertiary butyl groups is adjacent to the hydroxy group, or phenyl monosubstituted by C_{1-4} alkoxy.

3,976,659

PH SENSITIVE DYES CONTAINING A PHENOLATE GROUP

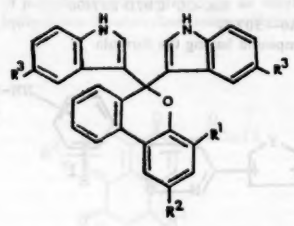
Alan L. Borror, Lexington, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Division of Ser. No. 454,693, March 25, 1974, Pat. No. 3,929,829, which is a continuation-in-part of Ser. No. 204,326, Dec. 2, 1971, abandoned. This application Aug. 28, 1975, Ser. No. 608,769

Int. Cl.² C07D *209/14*

U.S. Cl. 260—326.15 **4 Claims**

1. A pH sensitive indicator dye of the formula:



wherein R^1 and R^2 the same are hydrogen, chloro or nitro and R^3 is hydrogen; carboxy; $-NHSO_2R'$ or $-SO_2NHR''$ wherein R′ and R″ contain up to 20 carbon atoms and are selected from alkyl, phenyl, naphthyl, phenyl-substituted alkyl and alkyl-substituted phenyl; or alkoxy containing 1–18 carbon atoms.

3,976,660

PYRROLIDINE DERIVATIVES

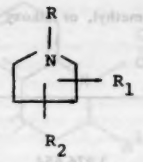
Miguel Angel Ondetti, Princeton, and Edward Condon, Trenton, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Aug. 15, 1974, Ser. No. 497,799

Int. Cl.² C07D *207/28*

U.S. Cl. 260—326.43 **20 Claims**

1. A compound of the formula



wherein R and R_1 each is hydrogen, $-(CH_2)_6COOH$, $-(CH_2)_6COO$—lower alkyl or $-(CH_2)_4COO$-benzyl; and R_2 is hydrogen, $-COO-(CH_2)_5CH_3$, $-CO-NH-(CH_2)_5CH_3$, $-(CH_2)_7CH_3$ or $-CH=CH-CH(OH)-(CH_2)_4CH_3$, with the proviso that at least one of R and R_1 is hydrogen, and at least one of the substituents represented by R_1 and R_2 is other than hydrogen and at least one of the long chain groups represented by R_1 R, or R_2 is present but not more than two of these long chain groups are present and physiologically acceptable acid addition salts thereof.

3,976,661

PYRROLO HEMIOXONOL DYES

Leslie G. S. Brooker, Rochester; Arthur Fumia, Jr., Hilton, and Donald W. Heseltine, Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 201,571, Nov. 23, 1971, Pat. No. 3,813,397, which is a division of Ser. No. 56,657, July 20, 1970, Pat. No. 3,652,289. This application Jan. 18, 1974, Ser. No. 434,751

Int. Cl.² C07D *295/14*, *405/08*, *409/08*

U.S. Cl. 260—326.5 SF **2 Claims**

1. A dye selected from the group consisting of: [5,5-dimethyl-1-(1-pyrrolidinyl)-1-cyclohexen-3-ylidene]-malononitrile; decyl-[5,5-dimethyl-1-(1-pyrrolidinyl)-1-cyclohexen-3-ylidene] cyanoacetate; [5,5-dimethyl-1-(1-pyrrolidinyl)-1-cyclohexen-3-ylidene](methylsulfonyl)acetonitrile; and [5,5-dimethyl-1-(1-pyrrolidinyl)-1-cyclohexen-3-ylidene] (dodecylsulfonyl) acetonitrile.

3,976,662

1:1 ADDUCTS OF 1-NAPHTHOL AND (NA)PHTHALALDEHYDIC ACID

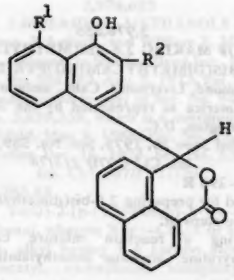
Eva R. Karger, Arlington, and Paul T. MacGregor, Lexington, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Continuation-in-part of Ser. No. 202,615, Nov. 26, 1971, Pat. No. 3,816,453. This application Apr. 1, 1974, Ser. No. 456,870

Int. Cl.² C07D *311/06*

U.S. Cl. 260—343.2 R **5 Claims**

1. A compound of the formula:



wherein R^1 and R^2 each are selected from hydrogen and a hydrogen-bonding group selected from carboxy, hydroxy, o-

hydroxyphenyl, bis trifluoromethyl carbinol, sulfonamido and sulfamoyl, at least one of R^1 and R^2 being hydrogen.

3,976,663

CERTAIN CYCLOPROPANE CARBOXYLIC ACID ESTERS OF 2,3-DIHYROBENZOFURAN-3-OLS

Wayne I. Fanta, Colerain Township, Hamilton County, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

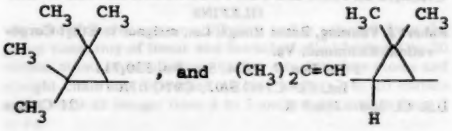
Continuation-in-part of Ser. No. 2,443, Jan. 12, 1970, abandoned. This application Dec. 9, 1971, Ser. No. 208,040

Int. Cl.² C07D *307/83*

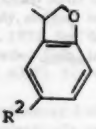
U.S. Cl. 260—346.2 R **17 Claims**

1. A compound of the formula

wherein R is a cyclopropane moiety selected from the group consisting of



and wherein R^1 is a 3-coumaranyl moiety of the formula



wherein R^2 is selected from the group consisting of hydrogen, halogen, nitro, thiomethyl, alkyl, alkoxyl, sulfonylmethyl, phenyl and benzyl.

3,976,664

CERTAIN DODECAHALO-9, 10-OXADECAHYDRO-1,4:5,8-DIMETHANOANTHRACENES

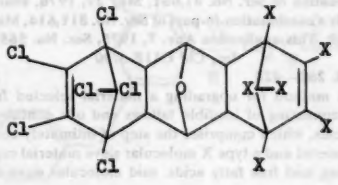
Yong S. Rim, Waterbury, and Walter Nudenberg, Newtown, both of Conn., assignors to Uniroyal Inc., New York, N.Y.

Filed July 29, 1974, Ser. No. 492,643

Int. Cl.² C07D *307/77*

U.S. Cl. 260—346.2 M **3 Claims**

1. A compound having the formula



in which all of the X substituents are either chlorine or bromine.

3,976,665

1,3-ADAMANTYLENE-BIS-TRIMELLITATE DIANHYDRIDES

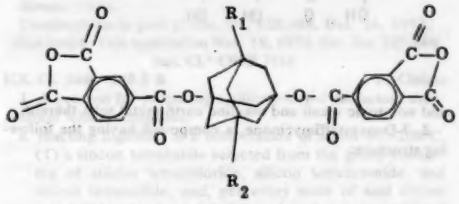
Allen Feinstein, Wheaton, and Ellis K. Fields, River Forest, both of Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed July 21, 1975, Ser. No. 597,339

Int. Cl.² C07D *307/89*

U.S. Cl. 260—346.3 **2 Claims**

1. A composition of matter having the general formula



wherein R_1 and R_2 are radicals individually selected from the group consisting of hydrogen, methyl, ethyl, isopropyl, n-propyl, t-butyl, phenyl, biphenyl, and naphthyl.

3,976,666

REMOVAL OF DEACTIVATING DUST PARTICLES FROM FIXED BED CATALYSTS IN THE VAPOR PHASE OXIDATION OF NAPHTHALENE TO PHTHALIC ANHYDRIDE

Gunthard Hoffmann, and Achim Striebeck, both of Marl, Germany, assignors to Chemische Werke Huls Aktiengesellschaft, Marl, Germany

Filed July 29, 1974, Ser. No. 492,672

Claims priority, application Germany, Aug. 8, 1974, 2340047

Int. Cl.² C07D *307/89*

U.S. Cl. 260—346.4 **6 Claims**

1. In a method where vapors of naphthalene are partially oxidized in a multi-tube reactor having fixed-bed catalysts therein to produce gaseous reaction products containing phthalic anhydride and deactivating dust particles deposited on the surface of said fixed-bed catalysts, the improvement comprising building up excess pressure in and to the rear of said multi-tube reactor, said excess pressure inert with respect to said catalysts, and impulsively decompressing said reactor in the direction of the reactor inlet and removing said deactivating dust particles from the surface of said catalysts.

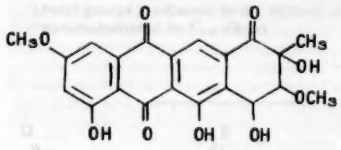
3,976,667

STEFFIMYCINONE, 7-DEOXYSTEFFIMYCINONE AND DERIVATIVES

Robert C. Kelly, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed June 19, 1975, Ser. No. 588,298
Int. Cl.² C07C *49/74, 69/18, 69/21, 69/30, 69/33, 69/61, 69/63, 69/67, 69/68, 69/74, 69/78, 69/84, 69/92, 69/96, 79/46, 121/00*
U.S. Cl. 260—365 4 Claims

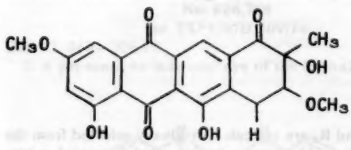
1. Steffimycinone, a compound having the following structure:



I

and non-toxic alkali and alkaline earth metal salts thereof.

2. 7-Deoxysteffimycinone, a compound having the following structure:



II

and non-toxic alkali and alkaline earth metal salts thereof.

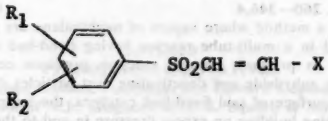
3,976,668

AMINOBENZENESULFONYL-ACRYLAMIDES

Sven U. K. A. Richter, Brookline, Mass., assignor to Sanitized, Inc., New York, N.Y.

Division of Ser. No. 228,410, Feb. 22, 1972, Pat. No. 3,821,399, which is a continuation of Ser. No. 844,176, July 23, 1969, abandoned, which is a continuation-in-part of Ser. No. 545,835, April 28, 1966, abandoned. This application June 27, 1974, Ser. No. 483,656
Int. Cl.² C07C *147/00*
U.S. Cl. 260—397.6 2 Claims

1. A compound of the formula



wherein R_1 is amino, R_2 is hydrogen or lower alkyl and X is $-CONH_2$.

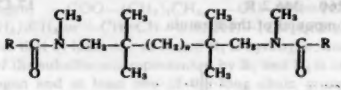
3,976,669

TERTIARY DIAMIDES

Robert M. Thompson, Chalfonte, Del., assignor to Sun Ventures, Inc., St. Davids, Pa.

Division of Ser. No. 293,979, Oct. 2, 1972, Pat. No. 3,888,894.
This application June 5, 1974, Ser. No. 476,627
The portion of the term of this patent subsequent to June 10, 1992, has been disclaimed.
Int. Cl.² C07C *103/127*
U.S. Cl. 260—404.5 3 Claims

1. A plasticizer consisting essentially of at least one liquid tertiary diamide having the following structural formula:



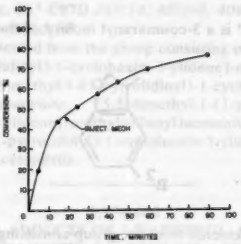
wherein n = 0 - 10 R = $-(CH_2)_m-CH_3$
wherein m = 4 - 12.

3,976,670

CHEMICAL PROCESS FOR PRODUCING ESTERS FROM OLEFINS

Robert J. Fanning, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Filed Dec. 9, 1974, Ser. No. 530,711
Int. Cl.² C11C *3/02*; C07C *67/04*
U.S. Cl. 260—410.9 R 21 Claims



1. In a process for the production of esters wherein a monoolefinic hydrocarbon having from about two to about twenty carbon atoms is reacted with carbon monoxide and an alcohol having up to about 5 carbon atoms per molecule in the presence of a Group VIII transition metal carbonyl catalyst and a pyridine promoter, the improvement consisting essentially of performing said reaction under conditions wherein substantially all of the olefin is supplied at the start of the reaction and from about 0.1 to 50 percent of the total alcohol is fed at one of: (a) the start of the reaction, or (b) after the start of the reaction and prior to the conclusion of the reaction, and the balance of the alcohol is supplied at the other of (a) and (b).

3,976,671

METHOD AND COMPOSITION FOR TREATING EDIBLE OILS AND INEDIBLE TALLOWS

Robert Leo Husch, Chicago, Ill., assignor to Interstate Foods Corporation, Chicago, Ill.

Continuation of Ser. No. 41,061, May 27, 1970, abandoned, which is a continuation-in-part of Ser. No. 811,614, March 28, 1969. This application Apr. 7, 1975, Ser. No. 565,625
Int. Cl.² C11B *3/00*
U.S. Cl. 260—428 1 Claim

1. A method for upgrading a material selected from the group consisting of inedible tallows and oils containing free fatty acids, which comprises the step of intimately contacting said material and a type X molecular sieve material capable of removing said free fatty acids, said molecular sieve material

being present in an amount of 0.1 to 0.15 per cent by weight of the material being processed.

3,976,672

(HYDROCARBYLPHENYLSULFONYL)ALKYLTRIMETHYLSTANNANES

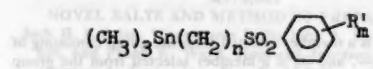
Richard J. Strunk, Cheshire, and Winchester Loomis Hubbard, Woodbridge, both of Conn., assignors to Uniroyal Inc., New York, N.Y.

Continuation-in-part of Ser. No. 536,679, Dec. 26, 1974, abandoned. This application Dec. 15, 1975, Ser. No. 641,060

Int. Cl.² C07F 7/22

U.S. Cl. 260—429.7 7 Claims

1. A tetrasubstituted organotin compound having the formula



wherein R′ is the same or different and is selected from the group consisting of linear and branched alkyl having 1 to 20 carbon atoms, cycloaliphatic having 4 to 6 carbon atoms and straight chain and branched alkenyl having 2 to 20 carbon atoms, *m* is an integer from 1 to 3 and *n* is an integer from 2 to 11.

3,976,673

4-CYCLOPROPYLMETHYLENEOXY-3-CHLOROPHENYLACETIC ACID AND SALTS THEREOF

Giorgio Pifferi, Milan, Italy, assignor to ISF SpA, Milan, Italy

Filed Jan. 9, 1975, Ser. No. 539,912

Claims priority, application Italy, Jan. 14, 1974, 19366/74

Int. Cl.² C07C 63/52, 87/14; C07F 1/08

U.S. Cl. 260—438.1 4 Claims

1. 4-Cyclopropylmethyleneoxy-3-chlorophenylacetic acid and its non-toxic pharmaceutically acceptable salts of alkali and alkaline earth metals, copper and organic bases.

3,976,674

ALUMINUM SALTS OF SUBSTITUTED PHENYLALKANOIC ACIDS

Calvin H. Fleids, and Clarence A. Hirsch, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Continuation-in-part of Ser. No. 302,709, Nov. 1, 1972, abandoned. This application May 13, 1974, Ser. No. 469,257

Int. Cl.² C07F 5/06

U.S. Cl. 260—448 R 5 Claims

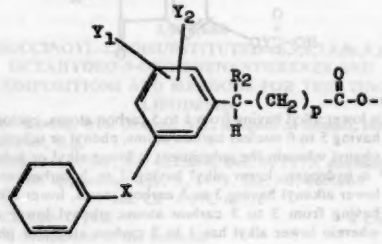
1. A compound of the formula:

$(R_1)_n$-Al-$(OH)_{3-n}$

wherein:

n is 1 or 2; and

R_1 is the moiety



wherein:

p is 0, 1, 2, or 3;

X is oxygen or sulfur;

R_2 is hydrogen, C_1-C_5 alkyl, C_2-C_5alkenyl, C_2-C_5 alkynyl, or C_3-C_6 cycloalkyl; and

Y_1 and Y_2 are, independently, hydrogen, hydroxy, halo, C_1-C_3 alkyl, or C_1-C_3 alkoxy, but Y_2 is hydrogen when Y_1 is hydroxy or C_1-C_3alkoxy.

3,976,675

SILICATE-BASED SURFACTANT COMPOSITION

Robert N. Scott, Wallingford; Henry F. Lederle, North Haven; Frank J. Milnes, Guilford, and Maurice A. Raymond, Northford, all of Conn., assignors to Olin Corporation, New Haven, Conn.

Continuation-in-part of Ser. No. 428,488, Dec. 26, 1973, abandoned. This application Nov. 19, 1974, Ser. No. 525,068

Int. Cl.² C07F 7/18

U.S. Cl. 260—448.8 R 17 Claims

1. A process for preparing a silicate-based surfactant composition which comprises:

a. reacting together, at a temperature of about 40°–200°C, (1) a silicon tetrahalide selected from the group consisting of silicon tetrachloride, silicon tetrabromide, and silicon tetraiodide, and, per every mole of said silicon tetrahalide (2) about 0.2–2.0 moles of water and (3) at least about one mole of an alcohol represented by the formula R_1OH wherein R_1 is alkyl of 2–20 carbon atoms or aryl of 6–14 carbon atoms, the reaction yielding a product made up of a volatile portion and a non-volatile portion, and

b. at a temperature of about 65°–320°C and in the presence of a transesterification catalyst, reacting the non-volatile portion of the product of step (a) with a polyether alcohol having a molecular weight of about 500–5,000 and represented by the formula R_3—$C_nH_{2n}O$— H wherein R_3 is alkyl of 1–10 carbon atoms and the moiety —$C_nH_{2n}O$— represents a polyoxyalkylene chain consisting of from about 10 to 100 percent by weight of oxyethylene units, and, correspondingly, about 90–0 percent of oxypropylene units, oxybutylene units or a mixture of oxypropylene and oxybutylene units, said polyether alcohol being employed in a molar proportion ranging from about 0.006 to about 1.1 moles per every mole of said silicon tetrayalide which is used in step (a), with the proviso that the molar proportion of said polyether alcohol is no more than about 55% of the molar proportion of alcohol consumed in the reaction of step (a).

3,976,676

POLYSILOXANE COMPOUNDS CONTAINING HYDROXYL GROUPS

Friedrich Lohse, Oberwil; Heinz Rembold, Ariesheim; Dieter Baumann, Birsfelden, all of Switzerland, and Kurt Munk, Wyhlen, Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

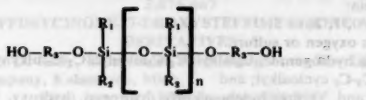
Filed Mar. 17, 1975, Ser. No. 558,987

Claims priority, application Switzerland, Mar. 25, 1974, 4106/74

Int. Cl.² C07F 7/18

U.S. Cl. 260—448.8 R 4 Claims

1. A polysiloxane of formula I



(I)

wherein R_1 and R_2 each denote a methyl, ethyl, propyl or phenyl and R_1 and R_2 on the same Si atom denote identical substituents and within the siloxane chain denote different substituents, R_3 denotes an alkylene with 2–6 C atoms, a lower alkyl-substituted alkylene with 2–6 C atoms in the alkylene chain or a cycloaliphatic-aliphatic residue and *n* denotes a number from 2 to 20.

3,976,677

PROCESS FOR CARBOXYLATING ORGANIC SUBSTRATES WITH CARBON DIOXIDE IN HYDROCARBON SOLVENTS

Giorgio Bottaccio; Gian Paolo Chiusoli, and Marcello Marchi, all of Novara, Italy, assignors to Montedison S.p.A., Milan, Italy

Filed Apr. 2, 1975, Ser. No. 564,335
Claims priority, application Italy, Apr. 3, 1974, 50019/74
Int. Cl.² C07C *65/18, 121/66*
U.S. Cl. 260—465 D **8 Claims**

1. A process for carboxylating organic substrates containing at least one activated hydrogen atom, which consists in reacting the substrate with CO_2 and an alkaline phenate selected from the group consisting of phenates substituted by

a. an alkyl group containing from 3 to 30 carbon atoms bound to the phenolic nucleus in ortho or meta position or in para position through a tertiary or quaternary carbon atom;

b. an alkyl group containing 1 to 20 carbon atoms bound to the phenolic nucleus in the ortho or meta positions through a primary or secondary carbon atom or by a phenyl group; and

c. at least two alkyl groups containing 1 to 20 carbon atoms or phenyl groups in ortho and para positions;

in a hydrocarbon solvent selected from the group consisting of aliphatic, alicyclic, aromatic, and alkyl-substituted aromatic solvents.

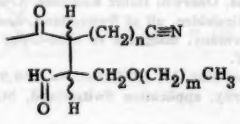
3,976,678

2,3-DISUBSTITUTED LEVULINALDEHYDES

Norman Kharasch, Los Angeles, Calif., and Ahmed I. Khodair, Cairo, Egypt, assignors to Intra-Science Research Foundation, Los Angeles, Calif.

Filed June 19, 1975, Ser. No. 588,187
Int. Cl.² C07C *121/34*
U.S. Cl. 260—465.6 **2 Claims**

1. 2,3-disubstituted levulinaldehydes of the general formula



wherein *n* represents an integer from 5 to 8 inclusive and *m* represents zero or an integer from 1 to 5 inclusive.

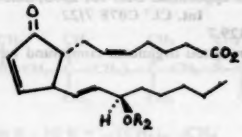
3,976,679

NOVEL COMPOUNDS FROM CORAL

Alfred J. Weinheimer, 1206 Oklahoma, Norman, Okla. 73069, and Robert L. Spraggins, 4151 Byron, Palo Alto, Calif. 94306

Filed July 23, 1970, Ser. No. 57,785
Int. Cl.² C07C *177/100*
U.S. Cl. 260—408 D **19 Claims**

1. A composition of matter consisting essentially of a compound of the formula



wherein R_1 is a member selected from the group consisting of H and CH_3—, and R_2 is a member selected from the group consisting of H and CH_3CO—.

3,976,680

PRODUCTION OF AN ESTER OF ONE ENANTIOMER OF AN α-AMINO ACID IN THE FORM OF A SALT WITH AN OPTICALLY ACTIVE ACID

John Colin Clark, Gerrards Cross, and Joseph Elks, London, both of England, assignors to Glaxo Laboratories Limited, Greenford, England

Filed Feb. 23, 1973, Ser. No. 335,304
Claims priority, application United Kingdom, Feb. 25, 1972, 8902/72; Dec. 22, 1972, 59431/72
Int. Cl.² C07B *19/00, 20/00*
U.S. Cl. 260—471 A **18 Claims**

1. A process for the production of an ester of one enantiomer of an α-amino acid in the form of a salt with an optically active acid, which comprises reacting an ester of the opposite enantiomer of said α-amino acid, which may be in admixture with an ester of the desired enantiomer, with said optically active acid and an aldehyde or ketone, whereby an ester of the desired enantiomer separates out in the form of the said salt.

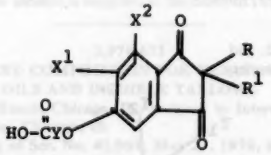
3,976,681

[1,3-DIOXO-2-SUBSTITUTED AND 2,2-DISUBSTITUTED-INDANYLOXY (OR THIO] ALKANOIC ACIDS

Edward J. Cragoe, Jr., Lansdale, and Otto W. Woltersdorf, Jr., Chalfont, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Oct. 12, 1973, Ser. No. 405,967
Int. Cl.² C07C *69/76, 65/14*
U.S. Cl. 260—473 F **10 Claims**

1. A compound of the formula:



wherein

R is lower alkyl having from 1 to 5 carbon atoms, cycloalkyl having 5 to 6 nuclear carbon atoms, phenyl or substituted phenyl wherein the substituent is lower alkyl or halo;

R^1 is hydrogen, lower alkyl having 1 to 5 carbon atoms, lower alkenyl having 3 to 5 carbon atoms, lower alkynyl having from 3 to 5 carbon atoms, phenyl lower alkyl wherein lower alkyl has 1 to 3 carbon atoms or phenyl

lower alkenyl or hydroxy lower alkyl; phenyl, or substituted phenyl wherein the substituent is lower alkyl or halo; or

R and R^1 may be joined together with the carbon atom to which they are attached to form a cycloalkyl having from 3 to 7 nuclear carbon atoms;

X^1 is hydrogen, methyl or halo and

X^2 is methyl or halo; or

Y is alkylene or haloalkylene containing a maximum of 4 carbon atoms,

and the non-toxic, pharmacologically acceptable salt and lower alkyl ester derivative thereof.

3,976,682

NOVEL SALTS AND METHOD OF PREPARATION

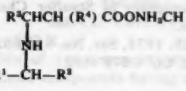
Jack H. Kolaian, Wappingers Falls; John A. Patterson, Fishkill, and Frank K. Ward, Hopewell Junction, all of N.Y., assignors to Texaco Inc., New York, N.Y.

Filed Aug. 5, 1974, Ser. No. 494,590

Int. Cl.² C07C *101/24*

U.S. Cl. 260—501.11 **10 Claims**

1. A secondary alkylammonium 3-secondary alkylaminoalkanoate corresponding to the formula:



where R^1 and R^2 are alkyl groups having from 1 to 23 carbon atoms, where the sum of R^1 and R^2 equals from 5 to 24 carbon atoms and where R^3 and R^4 are hydrogen or alkyl groups of from 1 to 3 carbons.

3,976,683

α-AMINO SUBSTITUTED THIOACETAMIDES

Adrian Charles Ward Curran, and Roger Crossley, both of Reading, England, assignors to John Wyeth & Brother Limited, Taplow, England

Filed Mar. 18, 1974, Ser. No. 452,028

Claims priority, application United Kingdom, Mar. 29, 1973, 15067/73

Int. Cl.² C07C *153/063*

U.S. Cl. 260—501.19 **3 Claims**

1. A compound selected from the group consisting of α-isopropylamino-α-phenylthioacetamide, α-dimethylamino-α-(3,4-dimethoxyphenyl)thioacetamide, and their acid addition salts with pharmaceutically acceptable acids.

3,976,684

1-SUCCINOYL-2,4-DISUBSTITUTED-4b,5,6,7,8,8a,9,10-OCTAHYDRO-9-OXO-PHENANTHRENES AND COMPOSITIONS AND METHODS FOR TREATING LIPODEMIA

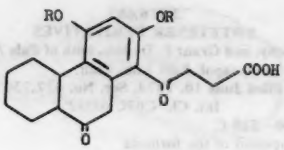
Sandor Barcza, West Orange, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

Continuation of Ser. No. 422,604, Dec. 6, 1973, abandoned. This application Apr. 4, 1975, Ser. No. 565,065

Int. Cl.² C07C *65/20*

U.S. Cl. 260—514.5 **4 Claims**

1. A compound of the formula



where

R represents hydrogen or lower alkyl having 1 to 4 carbon atoms.

3,976,685

CARBOXYALKYL AND CARBAMOYLALKYL SUBSTITUTED POLY(PHOSPHINE OXIDE) FLAME-RETARDANTS

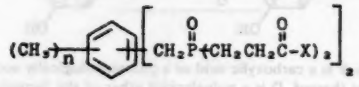
Joseph Adrian Hoffman, Somerville, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed Aug. 11, 1975, Ser. No. 603,463

Int. Cl.² C07C *63/14*

U.S. Cl. 260—515 M **5 Claims**

1. A compound having the formula



wherein X is OH an *n* is a whole, positive integer of 1–4, inclusive.

3,976,686

[1-OXO-2,3-HYDROCARBYLENE-5-INDANYLOXY(OR THIO)]ALKANOIC ACIDS

Edward J. Cragoe, Jr., Lansdale, and Otto W. Woltersdorf, Jr., Chalfont, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

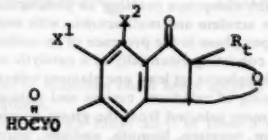
Filed Sept. 21, 1973, Ser. No. 399,568

Claims priority, application Canada, Oct. 13, 1972, 153921; Aug. 28, 1973, 178825

Int. Cl.² C07C *63/44*, *69/95*

U.S. Cl. 260—520 C **6 Claims**

1. A compound of the formula:



wherein

X^1 is hydrogen, halogen or methyl;

X^2 is halogen, methyl or trifluormethyl;

Y is alkylene or haloalkylene containing a maximum of 4 carbon atoms;

R is hydrogen or loweralkyl;

t is an integer having a value of 1;

Q is a saturated hydrocarbylene bridge containing together with the carbon atoms of the indane nucleus to which they are attached from 3 to 6 carbon atoms;

and the non-toxic pharmaceutically acceptable salt and lower-alkyl ester derivative thereof.

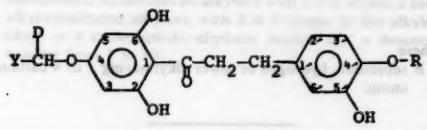
3,976,687

SWEETENER DERIVATIVES

Guy A. Crosby, and Grant E. DuBois, both of Palo Alto, Calif., assignors to Dynapol, Palo Alto, Calif.

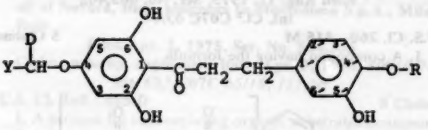
Filed June 10, 1974, Ser. No. 477,730
Int. Cl.² C07C 63/52
U.S. Cl. 260—520 C 5 Claims

1. A compound of the formula

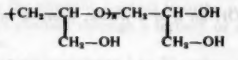


wherein Y is a carboxylic acid or a pharmacologically acceptable salt thereof, D is a linear polyether of the formula CH_3—$(O—CH_2—CH_2)_n$— wherein n has a value of from 1 to 30 inclusive, and R is a lower alkyl of from 1 to 4 carbon atoms inclusive.

2. A compound of the formula



wherein Y is a carboxylic acid or a pharmacologically acceptable slat thereof, D is a polyglycidol ether of the formula



wherein n equals about 5, and R is a lower alkyl of from 1 to 4 carbon atoms inclusive.

3,976,688

PROCESS FOR PREPARING UNSATURATED CARBOXYLIC ACIDS

Shinichi Akiyama, and Haruhisa Yamamoto, both of Takaoka, Japan, assignors to Nippon Zeon Co., Ltd., Tokyo, Japan

Filed Nov. 14, 1974, Ser. No. 523,683
Claims priority, application Japan, Nov. 26, 1973, 48-132432; Nov. 26, 1973, 48-132433
Int. Cl.² C07C 51/32
U.S. Cl. 260—530 N 16 Claims

1. A process for the preparation of an unsaturated carboxylic acid which comprises reacting an unsaturated aldehyde selected from acrolein and methacrolein with molecular oxygen in the vapor phase in the presence of an oxidation catalyst composition consisting essentially of a catalytic oxide of molybdenum, phosphorus, at least one element selected from the group consisting of rubidium, cesium and potassium, and at least one element selected from the group consisting of barium, cadmium, tungsten, bismuth, niobium, boron, lead and palladium, the catalyst composition having the following empirical formula

$$Mo_a P_b L_c T_d O_e$$

wherein L is at least one element selected from the group consisting of Rb, Cs and K; T is at least one element selected from the group consisting of Ba, Cd, W, Bi, Nb, B, Pb and Pd; and *a*, *b*, *c*, *d* and *e* each represent the number of atoms of each element: the atomic ratio of *a*:*b*:*c*:*d* is 12:0.1–8:0.1–8:0.1–8 and *e* is the number of oxygen atoms determined by the valence requirement of the other elements present.

3,976,689

PROCESS FOR PREPARING 3-FLUORO-D-ALANINE AND ITS DEUTERO ANALOGS

Donald F. Reinhold, North Plainfield, N.J., assignor to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 223,355, Feb. 3, 1972, abandoned. This application Nov. 20, 1974, Ser. No. 525,708
Int. Cl.² C07C 99/00, 101/10
U.S. Cl. 260—534 C 12 Claims

1. The process which comprises reacting fluoropyruvic acid with an optically active D-amine, thereby forming the corresponding D-ketimine, reacting the latter with a reducing agent characterized as adding hydrogen or deuterium to ketimines, thereby reducing the ketimine to form the corresponding N-substituted 3-fluoro-D-alanine or N-substituted-2-deutero-3-fluoro-D-alanine, and reacting the said N-substituted compound with hydrogen in the presence of palladium hydroxide-on-charcoal hydrogenation catalyst, thereby hydrogenolyzing the N-substituent to form 3-fluoro-D-alanine or 2-deutero-3-fluoro-D-alanine.

3,976,690

PROCESS FOR PREPARING ALKANE BIS-DIHALOPHOSPHINES

Arthur D. F. Toy, Stamford, Conn., and Eugene H. Uhing, Pleasantville, N.Y., assignors to Stauffer Chemical Company, Westport, Conn.

Filed Sept. 15, 1975, Ser. No. 613,683
Int. Cl.² C07F 9/52
U.S. Cl. 260—543 P 11 Claims

1. A method for preparing compounds of the formula:

wherein X is chlorine or bromine, and R_1, R_2, R_3 and R_4 are independently selected from the group consisting of hydrogen, and alkyl of 1 to 10 carbon atoms which comprises; reacting under at least autogenous pressure, at a temperature of from about 150°C. to about 350°C. an ethylenically unsaturated compound of the formula:

with a phosphorus compound of the formula:

$$PX_3$$

in the presence of elemental phosphorus wherein R_1, R_2, R_3, R_4 and X being as defined hereinabove.

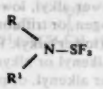
3,976,691

DIALKYLAMINOSULFUR TRIFLUORIDES AS FLUORINATING AGENTS

William Joseph Middleton, Chadds Ford, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 314,022, Dec. 11, 1972, Pat. No. 3,914,265. This application Jan. 10, 1975, Ser. No. 539,981
Int. Cl.² C07C 51/58, 17/16, 17/22; C07B 9/00
U.S. Cl. 260—544 F 5 Claims

1. A process for producing a fluorinated compound comprising contacting a compound of the formula



wherein each of R and R^1, alike or different, is a primary alkyl group of up to 4 carbon atoms or when taken together are $-(CH_2)_4-$ or $-(CH_2)_5-$ with a monomeric reactant selected from the group consisting of an aldehyde, ketone and carboxylic acid, under substantially anhydrous conditions at a temperature range of −100° to +100°C.

3,976,692

AMIDES OF 1-AMINOCYCLO-PENTANECARBOXYLIC ACID

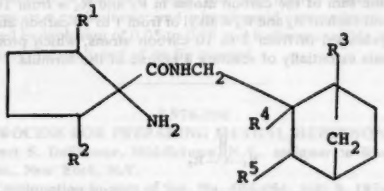
Harvey E. Alburn, West Chester, and Norman H. Grant, Wynnewood, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 408,137, Oct. 19, 1973, abandoned, which is a continuation of Ser. No. 209,427, Dec. 17, 1971, abandoned. This application Mar. 21, 1975, Ser. No. 560,896

Int. Cl.² C07C *103/19*

U.S. Cl. 260—557 R **3 Claims**

1. An amide of 1-aminocyclopentanecarboxylic acid selected from those compounds having the formula:



wherein R^1 and R^2 are each selected from the group consisting of hydrogen, lower alkyl, lower alkoxy, hydroxy, and nitro, with the proviso that either R^1 or R^2 is always hydrogen; R^3, R^4 and R^5 are each selected from the group consisting of lower alkyl and hydrogen, with the proviso that two of R^3, R^4 and R^5 are always hydrogen and the pharmaceutically-acceptable acid-addition salts thereof.

3,976,693

BENZOBICYCLOALKANONE OXIMES

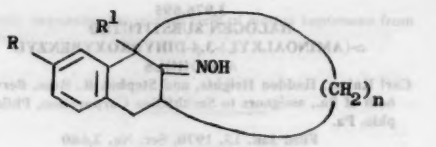
Meier E. Freed, Paoli, and John R. Potoski, Spring City, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 421,306, Dec. 3, 1973, abandoned, which is a division of Ser. No. 262,849, June 14, 1972, Pat. No. 3,836,670, which is a continuation-in-part of Ser. No. 200,517, Nov. 19, 1971, abandoned, which is a continuation-in-part of Ser. No. 94,983, Dec. 3, 1970, abandoned. This application July 17, 1975, Ser. No. 596,923

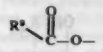
Int. Cl.² C07C *131/04*

U.S. Cl. 260—566 A **8 Claims**

1. A compound of the formula:



wherein R is hydrogen, lower alkyl, lower alkyloxy, hydroxy, phen(lower)alkyloxy, halogen, trifluoromethyl, or



whe.ein R^9 is lower alkyl of 1 to 6 carbon atoms either straight, branched chain, or concatenated to form a carbocyclic ring, or a carbocyclic aromatic nucleus of 6 to 10 carbon atoms, or a lower alkyl substituted carbocyclic aromatic nucleus of 6 to 10 carbon atoms; R^1 is lower alkyl, lower alkenyl, or phen(lower)alkyl; and *n* is an integer from 4 to 5.

3,976,694

α-AMINOALKYL-4-HYDROXY-3-ALKYLSULFONYLMETHYLPHENYL KETONES

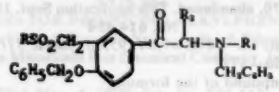
Carl Kaiser, Haddon Heights, N.J., and Stephen T. Ross, Berwyn, Pa., assignors to SmithKline Corporation, Philadelphia, Pa.

Division of Ser. No. 359,063, May 10, 1973, Pat. No. 3,917,704, which is a continuation-in-part of Ser. No. 236,177, March 20, 1972, abandoned. This application July 18, 1975, Ser. No. 596,941

Int. Cl.² C07C *97/10*

U.S. Cl. 260—570.5 C **10 Claims**

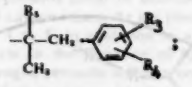
1. A chemical compound of the formula:



wherein:

R is straight or branched chain lower alkyl of from 1 to 5 carbon atoms;

R_1 is branched chain lower alkyl of from 3 to 5 carbon atoms, cycloalkyl or cycloalkylmethyl, the cycloalkyl moiety having from 3 to 6 carbon atoms, or



R_2 is hydrogen, methyl or ethyl;

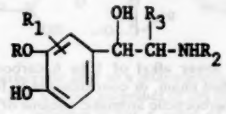
R_3 and R_4 are hydrogen, hydroxy or methoxy, and R_5 is hydrogen or methyl.

3,976,695
HALOGEN SUBSTITUTED α-(AMINOALKYL)-3,4-DIHYDROXYBENZYL ALCOHOLS

Carl Kaiser, Haddon Heights, and Stephen R. Ross, Berwyn, both of Pa., assignors to SmithKline Corporation, Philadelphia, Pa.

Filed Jan. 13, 1970, Ser. No. 2,660
Int. Cl.² C07C *91/22*
U.S. Cl. 260—570.6 **20 Claims**

1. A chemical compound of the formula:

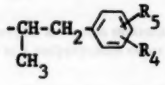


or a pharmaceutically acceptable acid addition salt C. said compound, wherein:

R is hydrogen or methyl;

R_1 is chlorine, bromine or fluorine;

R_2 is branched chain lower alkyl of from 3 to 5 carbon atoms, cycloalkyl or cycloalkylmethyl, the cycloalkyl moiety having from 3 to 6 carbon atoms; or



R_3 is hydrogen, methyl or ethyl; and

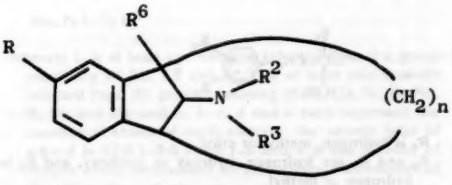
R_4 and R_5 are hydrogen, hydroxy or methoxy.

3,976,696
BENZOBICYCLOALKANE AMINES

Meier E. Freed, Paoli, and John R. Potoski, Spring City, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 421,375, Dec. 3, 1973, which is a division of Ser. No. 262,849, June 14, 1972, Pat. No. 3,836,670, which is a continuation-in-part of Ser. No. 200,517, Nov. 19, 1971, abandoned, which is a continuation-in-part of Ser. No. 94,983, Dec. 3, 1970, abandoned. This application Sept. 18, 1975, Ser. No. 614,454
Int. Cl.² C07C *87/64, 95/08*; A61K *31/135*
U.S. Cl. 260—571 **10 Claims**

1. A compound of the formula:



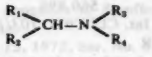
wherein R is hydrogen, lower alkyl, lower alkyloxy, hydroxy, phen(lower)alkyloxy, halogen, or trifluoromethyl; R^2 is hydrogen, lower alkyl, or phen(lower)alkyl; R^3 is hydrogen, lower alkyl, phen(lower)alkyl, alkenyl or alkynyl; R^6 is lower alkyl, hydroxy(lower)alkyl, lower alkenyl, or phen(lower)alkyl; and n is an integer of from 2 to 6; and the pharmaceutically nontoxic addition salts thereof.

3,976,697
PREPARATION OF TERTIARY AMINES

Lawrence F. Kuntschik, Nederland, and Orville W. Rigdon, Groves, both of Tex., assignors to Texaco Inc., New York, N.Y.

Filed Oct. 29, 1974, Ser. No. 518,336
Int. Cl.² C07C *87/00, 87/02*
U.S. Cl. 260—583 R **18 Claims**

1. A process for the manufacture of tertiary amines of the formula



which each of R_1 and R_2 is alkyl of from 2 to 24 carbon atoms and the sum of the carbon atoms in R_1 and R_2 is from 10 to 26, and each of R_3 and R_4 is alkyl of from 1 to 10 carbon atoms or cycloalkyl of from 3 to 10 carbon atoms, which process consists essentially of reacting a ketone of the formula

with a secondary amine of the formula

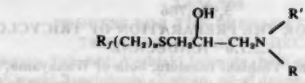
and hydrogen in the presence of a supported nickel catalyst at a pressure of from about 100 to 2000 p.s.i.g. and a temperature of from about 100° to about 300°F.

3,976,698
FLUORINE AND SULFUR-CONTAINING COMPOSITIONS

Robert Bonner Hager, Collegeville, Pa., assignor to Pennwalt Corporation, Philadelphia, Pa.

Division of Ser. No. 283,886, Aug. 25, 1972, abandoned. This application Apr. 8, 1974, Ser. No. 458,965
Int. Cl.² C07C *93/04*
U.S. Cl. 260—584 R **5 Claims**

1. An amine of the structure:



where n is 1–12 and R_f is selected from the group consisting of $CF_3(CF_2)_y$, $(CF_3)_2CF(CF_2)_y$ and $(CF_3)_2CFO(CF_2)_y$ where y is an integer of 1 to 14, and R and R' are independently hydrogen, alkyl or substituted alkyl.

3,976,699

SULFUR OXIDATION OF OLEFINS TO KETONES

Shigeto Suzuki, San Francisco, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Division of Ser. No. 52,310, July 6, 1970, Pat. No. 3,892,813. This application Feb. 11, 1975, Ser. No. 549,242

Int. Cl.² C07C *45/02*

U.S. Cl. 260—586 R **1 Claim**

1. The process for the conversion of a feed hydrocarbon having a single carbon-carbon double bond to a ketone having the same carbon atom content as said feed, which comprises maintaining in the liquid phase a mixture of the feed, water, and sulfur at a temperature in the range from about 225° to 325°C. for a period sufficient to produce an appreciable amount of said ketone, wherein for each mol of the feed the mixture contains an amount of sulfur in the range from about 0.15 to 2 mols, and an amount of water in the range from about 2 to 100 mols, said period being in the range from about 5 to 60 minutes; wherein said feed contains at least 3 carbon atoms, at least one carbon atom of the carbon-carbon double bond pair is a secondary carbon, said pair is not included in a six-membered carbocyclic ring, said feed is liquefiable at a temperature within said range, and said feed is either an n-alkene or a cycloalkene; and wherein said conversion is promoted by inclusion of 0.05 to 0.75 mol hydrogen sulfide in the mixture for each mol of olefin present.

3,976,700

PROCESS FOR PREPARING METHYL HEPTENONE

Robert S. DeSimone, Middletown, N.Y., assignor to Rhodia, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 484,494, July 8, 1974, abandoned. This application Mar. 24, 1975, Ser. No. 561,582

Int. Cl.² C07C *45/00*

U.S. Cl. 260—593 R **35 Claims**

1. In the process for preparing methyl heptenone from acetone which comprises reacting acetone at a temperature within the range from about −20° to about 150°C. with prenyl chloride in the presence of solid alkali metal hydroxide selected from the group consisting of potassium hydroxide, sodium hydroxide, and mixtures thereof, and as a catalyst a nitrogen compound which is selected from the group consisting of ammonia and aliphatic, cycloaliphatic and heterocyclic hydrocarbon amines having from one to about sixty carbon atoms, such hydrocarbon amines containing hydroxy substituents, such hydrocarbon amines containing carboxylic acid substituents, and such hydrocarbon amines containing nitro-substituents; the amounts of the acetone and prenyl chloride being in the molar ratio of from about 1:5 to about 20:1; the alkali metal hydroxide being in the proportion of from about 1 to about 2 moles per mole of prenyl chloride, and the amount of nitrogen compound being within the range from about 0.003 mole to about 1 mole per mole of prenyl chloride, the improvement which comprises separating methyl heptenone from the reaction mixture comprising prenyl-substituted methyl pentenones; subjecting the prenyl substituted methyl pentenones to hydrolytic cracking with water in the presence of alkali selected from the group consisting of alkali metal and alkaline earth metal hydroxides at a temperature within the range from about 50° to about 350°C., and recovering additional methyl heptenone from the resulting reaction mixture, thereby improving the overall yield of methyl heptenone from acetone.

3,976,701

PROCESS FOR THE PREPARATION OF 9,10-SECOESTRANE DERIVATIVES

Ulrich Eder; Gregor Haffer; Jurgen Ruppert; Gerhard Sauer, and Rudolf Wiechert, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin & Bergkamen, Germany

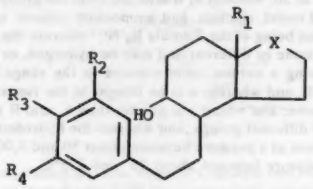
Filed Oct. 24, 1973, Ser. No. 409,234

Claims priority, application Germany, Oct. 25, 1972, 2253088

Int. Cl.² C07C *43/20*

U.S. Cl. 260—611 A **14 Claims**

1. A 9,10-seco-1,3,5(10)-estratriene-9-ol derivative of the formula



wherein R_1 is alkyl of 1–6 carbon atoms; R_2, R_3 and R_4 are each hydrogen or alkoxy of 1–8 carbon atoms; and X is hydroxymethylene; alkoxymethylene wherein the alkoxy group contains 1–10 carbon atoms; dialkoxymethylene wherein the alkoxy groups each contain 1–4 carbon atoms; or hydrocarbon aralkoxymethylene wherein the aralkoxy group contains 7–10 carbon atoms.

3,976,702

PROCESS FOR PRODUCING ALKYLPHENOLS

Takashi Suzuki, and Susumu Naito, both of Niigata, Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan

Filed Mar. 4, 1975, Ser. No. 555,113

Claims priority, application Japan, Mar. 4, 1974, 49-25043

Int. Cl.² C07C *39/06*

U.S. Cl. 260—621 R **14 Claims**

1. A process for preparing alkylphenols, comprising the steps of subjecting an alkyl-substituted aromatic aldehyde of the formula;

$$R_nArCHO$$

wherein R represents linear or branched alkyl radicals containing 1 to 4 carbon atoms, Ar is a phenyl radical and n is an integer from 1 to 5, to oxidation to a corresponding alkylphenol formate in the presence of hydrogen fluoride and aqueous hydrogen peroxide solution containing at least 30% by weight of hydrogen peroxide in an amount of from about 1.05 to 2.00 mol as H_2O_2 to one mol of starting aldehyde, at a temperature of about −50°C to 50°C and hydrolyzing the alkyl phenyl formate thus produced to the corresponding alkyl phenol in the presence of water.

3,976,703

HYDROFORMYLATION USING ARYL SULFONATE STABILIZER FOR COBALT CATALYST

John B. Wilkes, Richmond, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 32,386, April 27, 1970, abandoned. This application Apr. 4, 1974, Ser. No. 457,746

Int. Cl.[2] C07C *27/20, 29/16*

U.S. Cl. 260—632 HF 5 Claims

1. In the hydroformylation of an olefinically unsaturated hydrocarbon compound of 3 to 20 carbon atoms by the addition of carbon monoxide and hydrogen to a carbon-carbon double bond of the hydrocarbon compound in a liquid phase reaction mixture wherein the reaction is catalyzed by a catalyst comprising dicobalt octacarbonyl in an inert one-phase organic liquid medium, the improvement which comprises stabilizing the catalyst by adding to the mixture an aryl sulfonate of the formula

$$R_nYSO_3M$$

wherein Y is aryl of 6 to 13 carbon atoms, wherein R is an alkyl group having a carbon atom content in the range from about 3 to 30, wherein M is selected from the group consisting of alkali metal, calcium, and ammonium cations, said ammonium ions being of the formula $R_4'N^{(+)}$ wherein the groups R' are the same or different and may be hydrogen, or alkyl radicals having a carbon atom content in the range from 1 to about 20, and wherein *n* is an integer in the range from 1 to 4, inclusive, and where *n* is greater than 1, said R may be the same or different groups, and wherein the hydroformylation is carried out at a temperature between about 50 and 5,000 psig and a temperature between about 75° and 225°C.

3,976,704

NITRATION PROCESS

Ronald J. Vaughan, Claremont, Calif., assignor to Varen Technology, Marshallton, Del.

Filed Jan. 6, 1975, Ser. No. 538,723

Int. Cl.[2] C07C *79/10*

U.S. Cl. 260—645 10 Claims

1. In a process for the nitration of organic compounds which comprises contacting the organic compound with a nitrating agent at a temperature and pressure sufficient to form a nitrated reaction product, the improvement which comprises maintaining the nitrating agent and the organic compound substantially separated by means of a membrane, said membrane being substantially chemically inert to the action of both the organic compound and the nitration agent.

3,976,705

PREVENTION OF HYDROCHLORINATION

James J. Lukes, Cleveland; Norman L. Beckers, Chardon, and Jack A. Borror, Chesterland, all of Ohio, assignors to Diamond Shamrock Corporation, Cleveland, Ohio

Filed June 25, 1969, Ser. No. 836,649

Int. Cl.[2] C07C *21/00*

U.S. Cl. 260—654 H 5 Claims

1. In a process for the production of trichloroethylene and perchloroethylene by the vapor phase chlorination of ethylene and chlorinated ethanes and ethylenes in the presence of an alumina-containing fluid bed medium and involving the step of anhydrously quenching the gaseous reaction products from said vapor phase chlorination, the improvement which comprises preventing the undesired, aluminum chloride-catalyzed hydrochlorination of unsaturated, chlorinated ethylenes by the addition to the quenched reaction products of at least one compound capable of preferentially inactivating the ability of aluminum chloride to catalyze hydrochlorination.

3,976,706

PROCESS FOR THE PREPARATION OF TRICYCLO [5.3.1.0^{3,8}]UNDECANE

Naotake Takaishi; Yoshiaki Inamoto, both of Wakayama, and Kiyoshi Tsuchihashi, Kainan, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed July 2, 1974, Ser. No. 485,067

Claims priority, application Japan, July 10, 1973, 48-77622

Int. Cl.[2] C07C *5/24;* C07G *13/54*

U.S. Cl. 260—666 PY 4 Claims

1. A process for preparing tricyclo[5.3.1.0^{3,8}]undecane which comprises isomerizing tricyclo[5.2.2.0^{2,6}]undecane in an inert solvent, at a temperature in the range of −30° to 100°C, in the presence of an acid catalyst selected from the group consisting of (1) a Bronsted acid and (2) a Lewis acid in an amount of 0.01 to 0.2 mole per mole of starting tricyclo[5.2.2.0^{2,6}]undecane, terminating the isomerization reaction when the content of tricyclo[5.3.1.0^{3,8}]undecane in the reaction mixture is at least about 40 wt.%, excluding the solvent and acid catalyst, and recovering tricyclo[5.3.1.0^{3,8}]undecane from the reaction mixture.

3,976,707

PROCESS FOR THE PREPARATION OF TRICYCLO [5.3.1.0^{3,8}] UNDECANE

Naotake Takaishi, Iwademachi; Yoshiaki Inamoto, Wakayama, and Kiyoshi Tsuchihashi, Kainan, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed Apr. 28, 1975, Ser. No. 572,464

Claims priority, application Japan, May 8, 1974, 49-50815

Int. Cl.[2] C07C *13/54*

U.S. Cl. 260—666 PY 6 Claims

1. A process for preparing tricyclo[5.3.1.0^{3,8}]undecane which comprises isomerizing endo-tetramethylenenorbornane (I), in an inert solvent, at a temperature in the range of −30°C. to 100°C., in the presence of an acid catalyst selected from the group consisting of (1) a Bronsted acid in an amount of about 0.1 to 10 moles, per mole of I and (2) a Lewis acid in an amount of 0.001 to 0.1 mole, per mole of I; terminating the isomerization reaction when the content of tricyclo[5.3.1.0^{3,8}]undecane in the reaction mixture is in the range of more than about 80 weight percent, excluding the solvent and the acid catalyst; and recovering tricyclo[5.3.1.0^{3,8}]-undecane from the reaction mixture.

3,976,708

PROCESS FOR THE PREPARATION OF TRICYCLO[5.3.1.0^{3,8}]UNDECANE

Naotake Takaishi, Iwademachi; Yoshiaki Inamoto, Wakayama, and Kiyoshi Tsuchihashi, Kainan, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed May 23, 1975, Ser. No. 580,183

Claims priority, application Japan, May 31, 1974, 49-62231

Int. Cl.[2] C07C *13/54*

U.S. Cl. 260—666 PY 5 Claims

1. A process for preparing tricyclo[5.3.1.0^{3,8}]undecane (II) which comprises isomerizing 6,7-exo-trimethylenebicyclo[3.2.1]octane (I), at a temperature in the range of from −30° to +100°C., in the presence of an acid catalyst selected from the group consisting of (1) at least one Bronsted acid, and (2) at least one Lewis acid in an amount of 0.01 to 0.5 mole per mole of I; terminating the isomerization reaction when the content of II in the reaction mixture is at least about 30 weight percent; and recovering II from the reaction mixture.

3,976,709

PROCESS FOR THE PREPARATION OF TRICYCLO[5.3.1.0^{3,8}]UNDECANE

Naotake Takaishi; Yoshiaki Inamoto, both of Wakayama, and Kiyoshi Tsuchihashi, Kainan, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed May 30, 1975, Ser. No. 582,108
Claims priority, application Japan, June 4, 1974, 49-63236
Int. Cl.^{2} C07C *13/54*
U.S. Cl. 260—666 PY 5 Claims

1. A process for preparing tricyclo[5.3.1.0^{3,8}]undecane (II) which comprises isomerizing 6,7-endo-trimethylenebicyclo[3.2.1]octane (I), at a temperature in the range of from −30° to +100°C., in the presence of an acid catalyst selected from the group consisting of (1) at least one Bronsted acid, and (2) at least one Lewis acid in an amount of 0.01 to 0.5 mole per mole of I; terminating the isomerization reaction when the content of II in the reaction mixture is at least about 60 weight percent; and recovering II from the reaction mixture.

3,976,710

PROCESS FOR THE PREPARATION OF TRICYCLO[5.3.1.0^{3,8}]UNDECANE

Naotake Takaishi, Iwademachi; Yoshiaki Inamoto, Wakayama, and Kiyoshi Tsuchihashi, Kainan, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed May 30, 1975, Ser. No. 582,166
Claims priority, application Japan, May 31, 1974, 49-62232
Int. Cl.^{2} C07C *13/54*
U.S. Cl. 260—666 PY 5 Claims

1. A process for preparing tricyclo[5.3.1.0^{3,8}]undecane (I) which comprises isomerizing 5,6-exo-trimethylenenorbornyl-2-carbinol, at a temperature in the range of from −80° to +100°C., in the presence of an acid catalyst selected from the group consisting of (1) at least one Bronsted acid, and (2) at least one Lewis acid, and in the presence of at least one hydride donor, until a substantial quantity of I is formed, and recovering I from the reaction mixture.

3,976,711

PROCESS FOR THE PREPARATION OF TRICYCLO[5.3.1.0^{3,8}]UNDECANE

Naotake Takaishi; Yoshiaki Inamoto, both of Wakayama, and Kiyoshi Tsuchihashi, Kainan, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed June 3, 1975, Ser. No. 583,422
Claims priority, application Japan, June 4, 1974, 49-63237
Int. Cl.^{2} C07C *13/54*
U.S. Cl. 260—666 PY 5 Claims

1. A process for preparing tricyclo[5.3.1.0^{3,8}]undecane (II) which comprises isomerizing homoadamantane (I), at a temperature in the range of from −30°to +100°C., in the presence of an acid catalyst selected from the group consisting of (1) at least one Brønsted acid, and (2) at least one Lewis acid in an amount of 0.001 to 0.5 mole per mole of I; terminating the isomerization reaction when the content of II in the reaction mixture is at least about 15 weight percent; and recovering II from the reaction mixture.

3,976,712

2,4-EXO-ETHANOBICYCLO[3.3.1]NONANE

Naotake Takaishi, Iwademachi; Yoshiaki Inamoto, Wakayama, and Kiyoshi Tsuchihashi, Kainan, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed July 17, 1975, Ser. No. 596,618
Claims priority, application Japan, July 24, 1974, 49-84944
Int. Cl.^{2} C07C *13/28*
U.S. Cl. 260—666 PY 1 Claim

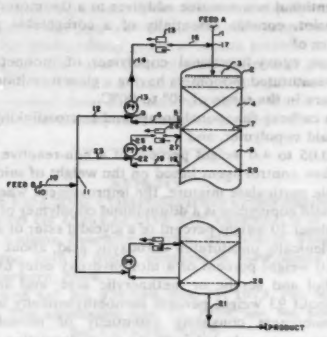
1. 2,4-exo-ethanobicyclo[3.3.1]nonane.

3,976,713

ISOPARAFFIN-OLEFIN ALKYLATION UTILIZING RECYCLE STREAMS AND MULTIPLE PACKED CATALYST BEDS

Timothy L. Holmes, Pomona, Calif., and Sheldon L. Thompson, Glen Mills, Pa., assignors to Sun Oil Company of Pennsylvania, Philadelphia, Pa.

Continuation-in-part of Ser. No. 152,167, June 11, 1971, abandoned. This application June 19, 1975, Ser. No. 588,569
Int. Cl.^{2} C07C *3/52*
U.S. Cl. 260—683.45 3 Claims



1. An alkylation process wherein a catalyst bed of granular solids is contacted with fluid reactants which comprises:

a. passing a first mixture of an isoparaffin and an olefin fluid through a first bed in a series of at least two packed beds of said granular solids,

b. separating the fluid effluent from said first bed into a first portion and a second portion,

c. mixing said first portion with a feed stream of said olefin fluid and passing said second mixture through a heat exchanger to remove heat and then recycling said second mixture through said first bed,

d. passing said second portion through a second bed in series,

e. separating the fluid effluent from said second bed into a first portion and a second portion,

f. mixing said first portion from said second bed with a feed stream of said olefin fluid and passing said third mixture through a heat exchanger to remove heat and then recycling said third mixture through said second bed, and

g. withdrawing an alkylation product from said second portion of step (e)

3,976,714

NORMAL PARAFFIN ALKYLATION WITH A CATALYST OF A LEWIS ACID AND GROUP VIII METAL INTERCALATED IN GRAPHITE

Paul G. Rodewald, Rocky Hill, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Division of Ser. No. 467,316, May 6, 1974, Pat. No. 3,925,495. This application June 26, 1975, Ser. No. 590,535
Int. Cl.^{2} C07C *3/56*
U.S. Cl. 260—683.47 6 Claims

1. A process for effecting alkylation of a normal paraffin which comprises contacting said normal paraffin under alkylation conditions with an alkylating agent selected from the group consisting of olefin, alkylhalide and alcohol with a catalyst consisting essentially of graphite having intercalated in the lattice thereof between about 5 and about 75 weight percent of a Lewis acid consisting essentially of a halide of an element of Group IIA, IIIA, IVB, V or VIB and between about 0.1 and about 20 weight percent of a Group VIII metal.

3,976,715

POWDER COATING COMPOSITIONS COMPRISING A BLEND OF COREACTIVE POLYMERS - IIA

Santokh S. Labana, Dearborn Heights, and Ares N. Theodore, Farmington, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Division of Ser. No. 426,169, Dec. 19, 1973, Pat. No. 3,914,333. This application Aug. 21, 1975, Ser. No. 606,681

Int. Cl.[2] C08L *63/00*

U.S. Cl. 260—836 3 Claims

1. In a thermosettable powder paint which exclusive of pigments, antistatic agents, and plasticizers, the same being conventional non-reactive additives to a thermosettable powder paint, consists essentially of a coreactable particulate mixture of

1. an epoxy-functional copolymer of monoethylenically unsaturated monomers having a glass transition temperature in the range of 40° to 90°C.,
2. a carboxy-functional compound as crosslinking agent for said copolymer, and
3. 0.05 to 4.0 weight percent of a non-reactive polymeric flow control agent based on the weight of said coreactable particulate mixture, the improvement wherein:

A. said copolymer is a difunctional copolymer of about 5 to about 20 weight percent of a glycidyl ester of a monoethylenically unsaturated carboxylic acid, about 2 to about 10 weight percent of a monohydroxy ester of a $C_2 - C_4$ diol and acrylic or methacrylic acid, and about 70 to about 93 weight percent monoethylenically unsaturated monomers consisting essentially of monofunctional monomers selected from the group consisting of esters of a $C_1 - C_8$ monohydric alcohol and acrylic acid, esters of a $C_1 - C_8$ monohydric alcohol and methacrylic acid, and $C_8 - C_{12}$ monovinyl hydrocarbons, and has average molecular weight in the range of about 1500 to about 15,000, and

B. said carboxy-functional compound is a difunctional copolymer of about 2 to about 20 weight percent of an anhydride of an alpha-beta olefinically unsaturated dicarboxylic acid, about 2 to about 20 weight percent of an alpha-beta olefinically unsaturated monocarboxylic acid and a remainder making a total of 100 weight percent of monoethylenically unsaturated monomers consisting essentially of monofunctional monomers selected from the group consisting of esters of a $C_1 - C_8$ monohydric alcohol and acrylic acid, esters of a $C_1 - C_8$ monohydric alcohol and methacrylic acid and $C_8 - C_{12}$ monovinyl hydrocarbons, and has average molecular weight in the range of about 1500 to about 15,000, said carboxy-functional compound being present in an amount such that the functional group of greatest concentration thereon provides about 0.3 to about 1.2 functional groups per functional group on said epoxy-functional copolymer that is reactable with said carboxy-functional compound and such that the functional group of second greatest concentration on said carboxy-functional compound provides about 0.1 to about 0.4 functional group per functional group on said epoxy-functional copolymer that is reactable with said carboxy-functional compound.

3,976,716

POWDER COATING COMPOSITIONS COMPRISING A BLEND OF COREACTIVE POLYMERS - IIB

Santokh S. Labana, Dearborn Heights, and Ares N. Theodore, Farmington, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Division of Ser. No. 426,169, Dec. 19, 1973, Pat. No. 3,914,333. This application Aug. 21, 1975, Ser. No. 606,682

Int. Cl.[2] C08L *63/00*

U.S. Cl. 260—836 1 Claim

1. In a thermosettable powder paint which exclusive of pigments, antistatic agents, and plasticizers, the same being conventional non-reactive additives to a thermosettable powder paint, consists essentially of a coreactable particulate mixture of

1. an epoxy-functional copolymer of monoethylenically unsaturated monomers having a glass transition temperature in the range of 40° to 90°C.,
2. a carboxy-functional compound as crosslinking agent for said copolymer, and
3. 0.05 to 4.0 weight percent of a non-reactive polymeric flow control agent based on the weight of said coreactable particulate mixture, the improvement wherein:

A. said copolymer is a difunctional copolymer of about 5 to about 20 weight percent of a glycidyl ester of a monoethylenically unsaturated carboxylic acid, about 2 to about 10 weight percent of an anhydride of an alpha-beta olefinically unsaturated dicarboxylic acid, and about 70 to about 93 weight percent monoethylenically unsaturated monomers consisting essentially of monofunctional monomers selected from the group consisting of esters of a $C_1 - C_8$ monohydric alcohol and methacrylic acid, and $C_8 - C_{12}$ monovinyl hydrocarbons, and has average molecular weight in the range of about 1500 to about 15,000 and

B. said carboxy-functional compound is a difunctional copolymer of about 5 to about 20 weight percent of an alpha-beta olefinically unsaturated monocarboxylic acid, about 2 to about 10 weight percent of a monohydroxy ester of a $C_2 - C_4$ diol and acrylic or methacrylic acid, and about 70 to about 93 monoethylenically unsaturated monomers consisting essentially of monofunctional monomers selected from the group consisting of esters of a $C_1 - C_8$ monohydric alcohol and acrylic acid, esters of a $C_1 - C_8$ monohydric alcohol and methacrylic acid, and $C_8 - C_{12}$ monovinyl hydrocarbons, and has average molecular weight in the range of about 1500 to about 15,000, said carboxy-functional compound being present in an amount such that the functional group of greatest concentration thereon provides about 0.3 to about 1.2 functional groups per functional group on said epoxy-functional copolymer that is reactable with said carboxy-functional compound and such that the functional group of second greatest concentration on said carboxy-functional compound provides about 0.1 to about 0.4 functional group per functional group on said epoxy-functional copolymer that is reactable with said carboxy-functional compound.

3,976,717

POWDER COATING COMPOSITIONS COMPRISING A BLEND OF COREACTIVE POLYMERS - IIC

Santokh S. Labana, Dearborn Heights, and Ares N. Theodore, Farmington, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Division of Ser. No. 426,169, Dec. 19, 1973, Pat. No. 3,914,333. This application Aug. 21, 1975, Ser. No. 606,680

Int. Cl.[2] C08L *63/00*

U.S. Cl. 260—836 1 Claim

1. In a thermosettable powder paint which exclusive of pigments, antistatic agents, and plasticizers, the same being conventional non-reactive additives to a thermosettable powder paint, consists essentially of a coreactable particulate mixture of

1. an epoxy-functional copolymer of monoethylenically unsaturated monomers having a glass transition temperature in the range of 40°C. to 90°C.,
2. an anhydride-functional compound as crosslinking agent for said copolymer, and
3. 0.05 to 4.0 weight percent of a non-reactive polymeric flow control agent based on the weight

of said coreactable particulate mixture, the improvement wherein:

A. said copolymer is a difunctional copolymer of about 5 to about 20 weight percent of a glycidyl ester of a monoethylenically unsaturated carboxylic acid, about 2 to about

10 weight percent of an alpha-beta olefinically unsaturated amide, and about 70 to about 93 weight percent monoethylenically unsaturated monomers consisting essentially of monofunctional monomers selected from the group consisting of esters of a $C_1 - C_8$ monohydric alcohol and acrylic acid, esters of a $C_1 - C_8$ monohydric alcohol and methacrylic acid and $C_8 - C_{12}$ monovinyl hydrocarbons, and has average molecular weight in the range of about 1500 to about 15,000, and

B. said anhydride-functional compound is a difunctional copolymer of about 5 to about 20 weight percent of a glycidyl ester of a monoethylenically unsaturated carboxylic acid, about 2 to about 10 weight percent of an anhydride of an alpha-beta olefinically unsaturated dicarboxylic acid, and about 70 to about 73 weight percent monoethylenically unsaturated monomers consisting essentially of monofunctional monomers selected from the group consisting of esters of a $C_1 - C_8$ monohydric alcohol and acrylic acid, esters of a $C_1 - C_8$ monohydric alcohol and methacrylic acid, and $C_8 - C_{12}$ monovinyl hydrocarbons, and has average molecular weight in the range of about 1500 to about 15,000, said anhydride-functional compound being present in an amount such that the functional group of greatest concentration thereon provides about 0.3 to about 1.2 functional groups per functional group on said epoxy-functional copolymer that is reactable with said anhydride-functional compound and such that the functional group of second greatest concentration on said anhydride-functional compound provides about 0.1 to about 0.4 functional group per functional group on said epoxy-functional copolymer that is reactable with said anhydride-functional compound.

3,976,718

POWDER COATING COMPOSITIONS COMPRISING A BLEND OF COREACTIVE POLYMERS - II E

Santokh S. Labana, Dearborn Heights, and Ares N. Theodore, Farmington, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Division of Ser. No. 426,169, Dec. 19, 1976, Pat. No. 3,914,333. This application Aug. 21, 1975, Ser. No. 606,679

Int. Cl.[2] C08L *63/00*

U.S. Cl. 260—836 **1 Claim**

1. In a thermosettable powder paint which exclusive of pigments, antistatic agents, and plasticizers, the same being conventional non-reactive additives to a thermosettable powder paint, consists essentially of a coreactable particulate mixture of

1. an epoxy-functional copolymer of monoethylenically unsaturated monomers having a glass transition temperature in the range of 40°C. to 90°C.,
2. a carboxy-functional compound as crosslinking agent for said copolymer, and
3. 0.05 to 4.0 weight percent of a non-reactive polymeric flow control agent based on the weight of said coreactable particulate mixture,

the improvement wherein:

A. said copolymer is a difunctional copolymer of about 5 to about 20 weight percent of a glycidyl ester of a monoethylenically unsaturated carboxylic acid, about 2 to about 10 weight percent of a monohydroxy ester of a $C_2 - C_4$ diol and acrylic or methacrylic acid, and about 70 to about 93 weight percent monoethylenically unsaturated monomers consisting essentially of monofunctional monomers selected from the group consisting of esters of a $C_1 - C_8$ monohydric alcohol and acrylic acid, esters of a $C_1 - C_8$ monohydric alcohol and methacrylic acid and $C_8 - C_{12}$ monovinyl hydrocarbons, and has average molecular weight in the range of about 1500 to about 15,000, and

B. said carboxy-functional compound is a difunctional copolymer of about 5 to about 20 weight percent of an alpha-beta olefinically unsaturated monocarboxylic acid, about 2 to about 10 weight of an alpha-beta olefinically unsaturated amide, and about 70 to about 93 weight percent monoethylenically unsaturated monomers consisting essentially of monofunctional monomers selected from the group consisting of esters of a $C_1 - C_8$ monohydric alcohol and acrylic acid, esters of a $C_1 - C_8$ monohydric alcohol and methacrylic acid, and $C_8 - C_{12}$ monovinyl hydrocarbons, and has average molecular weight in the range of about 1500 to about 15,000, said carboxy-functional compound being present in an amount such that the functional group of greatest concentration thereon provides about 0.3 to about 1.2 functional groups per functional group on said epoxy-functional copolymer that is reactive with said carboxy-functional compound and such that the functional group of second greatest concentration on said carboxy-functional compound provides about 0.1 to about 0.4 functional groups per functional group on said epoxy-functional copolymer that is reactable with said carboxy-functional compound.

3,976,719

POWDER COATING COMPOSITIONS COMPRISING A BLEND OF COREACTIVE POLYMERS - II D

Santokh S. Labana, Dearborn Heights, and Ares N. Theodore, Farmington, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Division of Ser. No. 426,169, Dec. 19, 1973, Pat. No. 3,914,333. This application Aug. 21, 1975, Ser. No. 606,678

Int. Cl.[2] C08L *63/00*

U.S. Cl. 260—836 **1 Claim**

1. In a thermosettable powder paint which exclusive of pigments, antistatic agents, and plasticizers, the same being conventional non-reactive additives to a thermosettable powder paint, consists essentially of a coreactable particulate mixture of

1. an epoxy-functional copolymer of monoethylenically unsaturated monomers having a glass transition temperature in the range of 40°C. to 90°C.,
2. a carboxy-functional compound as crosslinking agent for said copolymer, and
3. 0.05 to 4.0 weight percent of a non-reactive polymeric flow control agent based on the weight of said coreactable particulate mixture,

the improvement wherein:

A. said copolymer is a difunctional copolymer of about 5 to about 20 weight percent of a glycidyl ester of a monoethylenically unsaturated carboxylic acid, about 2 to about 10 weight percent of an alpha-beta olefinically unsaturated amide, and about 70 to about 93 weight percent monoethylenically unsaturated monomers consisting essentially of monofunctional monomers selected from the group consisting of esters of a $C_1 - C_8$ monohydric alcohol and acrylic acid, esters of a $C_1 - C_8$ monohydric alcohol and methacrylic acid, and $C_8 - C_{12}$ monovinyl hydrocarbons, and has average molecular weight in the range of about 1500 to about 15,000, and

B. said carboxy-functional compound is a difunctional copolymer of about 5 to about 20 weight percent of an alpha-beta olefinically unsaturated monocarboxylic acid, about 2 to about 10 weight percent of a monohydroxy ester of a $C_2 - C_4$ diol and acrylic or methacrylic acid, and about 70 to about 93 weight percent monoethylenically unsaturated monomers consisting essentially of monofunctional monomers selected from the group consisting of esters of a $C_1 - C_8$ monohydric alcohol and acrylic acid, esters of a $C_1 - C_8$ monohydric alcohol and methacrylic acid, and $C_8 - C_{12}$ monovinyl hydrocarbons, and has average molecular weight in the range of about 1500 to about 15,000, said carboxy-functional compound being present in an amount such that the functional group of greatest concentration thereon provides about 0.3 to about 1.2 functional groups per functional group on said epoxy-functional copolymer that is reactive with said

carboxy-functional compound and such that the functional group of second greatest concentration on said carboxy-functional compound provides about 0.1 to about 0.4 functional groups per functional group on said epoxy-functional copolymer that is reactable with said carboxy-functional compound.

3,976,720

POLYAMIDE/POLYOLEFIN PLASTIC GRAFT COPOLYMERS

Clarence Frederick Hammer, and Howard Warner Starkweather, Jr., both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 13, 1974, Ser. No. 523,466
Int. Cl.² C08F 255/02, 267/04, 267/06
U.S. Cl. 260—857 G **16 Claims**

1. Plastic graft copolymer consisting essentially of a trunk copolymer derived from 70 to 99 percent by weight ethylene and a comonomer providing amine-reactive sites taken from the group consisting of an anhydride group, a vicinal pair of carboxylic groups and a carboxylic group adjacent to an alkoxycarbonyl group, wherein the alkoxy group has up to 20 carbon atoms, and side chain polymers linked to said reactive sites through amide or imide linkages, said side chains having an average degree of polymerization of 6 to 8 and having substantially unreactive N-alkyl amide end groups wherein alkyl is in the range of 4 to 6 carbon atoms and being derived from monomers taken from the group consisting of caprolactam or laurolactam, said graft copolymer having a polyamide content of 15 to 50 percent by weight based on the weight of graft copolymer with the proviso that the graft copolymer has two DTA melting points, one at 80° to 115°C. and the other at at least 165° C. when polycaprolactam side chains are present and at least 150°C. when polylaurolactam side chains are present.

3,976,721

METHOD OF PRODUCING POLYSTYRENE COMPOSITION

Kunio Satake, Yokohama; Tsuyoshi Yamada, Yokosuka; Kuniaki Sakamoto, Yokohama; Kiyoshi Hayakawa, Yokohama, and Isaburo Fukawa, Yokohama, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed June 3, 1975, Ser. No. 583,265
Claims priority, application Japan, June 12, 1974, 49-66057
Int. Cl.² C08L 9/06
U.S. Cl. 260—880 R **14 Claims**

8. A high-impact polystyrene composition obtained by polymerizing a mixture consisting of

1. 2–20% by weight of a solution-polymerization SBR of a random copolymer type obtained by solution-polymerization of butadiene and styrene in the presence of a lithium-based catalyst, and having a styrene content continuously and gradually reduced along the polymer chain, wherein the styrene content in said random copolymer is in the range of 3–10% by weight; the butadiene content therein is in the range of 90–97% by weight; among the modes of linkage in butadiene portion, 1,2-vinyl linkage is 20% or less; the block styrene content is 20% or less by weight of the total styrene content; and when the polymer chain (A-B) is divided into two equal molecular weight portions A and B, portion A has a styrene content of 1.5–2 times the average styrene content in the total copolymer and portion B has a styrene content of ½ or less of the average styrene content in the total copolymer, and
2. 80–98% by weight of styrene,

said polymerization being carried out in a manner of radical polymerization.

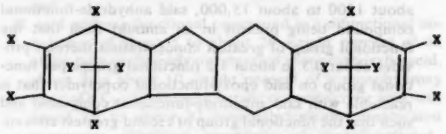
3,976,722

POLYMER COMPOSITIONS CONTAINING ADDUCT OF HEXAHALOCYCLOPENTADIENE AND BICYCLONONADIENE

Richard D. Carlson, Grand Island, N.Y., assignor to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Continuation of Ser. No. 490,146, July 22, 1974, abandoned. This application May 27, 1975, Ser. No. 581,008
Int. Cl.² C08J 3/20
U.S. Cl. 260—880 R **10 Claims**

1. A fire retardant polymeric composition comprising a polymer which is free of recurring carbonamide groups as an integral part of the main polymer chain and an effective fire retardant proportion of a compound of the formula:



wherein X is selected from the group consisting of bromine, chlorine, and fluorine, Y is selected from the group consisting of bromine, chlorine, fluorine, alkyl of 1 to 10 carbon atoms, alkyloxy wherein the alkyl group contains 1 to 10 carbon atoms, haloalkyl and haloalkyloxy wherein the alkyl groups contain 1 to 10 carbon atoms and halo is fluoro, chloro, or bromo.

8. The composition of claim 1 wherein the polymer is a graft co-polymer of polybutadiene, styrene and acrylonitrile.

3,976,723

PREPARATION AND USE OF ACRYLIC IONOMER ELASTOMERS

Alan D. Williams, Richboro, Pa.; John A. Powell; Daniel T. Carty, both of Willingboro, N.J., and James A. Oline, Wyncote, Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Division of Ser. No. 315,373, Dec. 15, 1972, abandoned, which is a continuation-in-part of Ser. No. 82,194, Oct. 19, 1970, abandoned. This application Mar. 24, 1975, Ser. No. 561,563
Int. Cl.² C08L 31/02
U.S. Cl. 260—885 **7 Claims**

1. In a process for curing alkyl acrylate polymers containing free carboxyl groups, said alkyl acrylate polymer being polymerized from (a) 50 to 99.5 parts by weight of alkyl acrylate and (b) 0.5 to 20 parts by weight of a copolymerizable ethylenically unsaturated carboxylic acid, comprising condensing said carboxyl groups with a polyvalent metal oxide to produce polymeric metalo-carboxylate elastomers characterized by a three dimensional cross-linked structure, the improvement comprising neutralizing some of the carboxyl groups with a monovalent metal oxide or ammonia prior to condensing with the polyvalent metal oxide.

3,976,724

BLENDS OF ACID-CONTAINING COPOLYMERS AND COPOLYMERS OF ACRYLONITRILE AND A CONJUGATED DIOLEFIN

Harold G. Frank, Bay City, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 327,395, Jan. 29, 1973, Pat. No. 3,922,421. This application Apr. 28, 1975, Ser. No. 572,022
Int. Cl.² C08K 5/01; C08L 9/02, 23/08
U.S. Cl. 260—889 3 Claims

1. A composition having improved adhesive characteristics comprising an intimate mixture of:

a. between about 80 and about 98 weight percent acid-containing copolymer of ethylene and an α,β-ethylenically unsaturated carboxylic acid having between 3 and 8 carbon atoms per molecule, said acid-containing copolymer having a melt index between about 0.5 and about 100 and containing between about 1 and about 20 weight percent of said α,β-ethylenically unsaturated carboxylic acid, and

b. between about 2 and about 20 weight percent copolymer of acrylonitrile and conjugated diolefin having between 4 and 8 carbon atoms per molecule, said copolymer of acrylonitrile and conjugated diolefin having a relatively low molecular weight characterized in that said copolymer will flow at ordinary room temperature and containing between about 15 and about 60 weight percent acrylonitrile and between about 40 and about 85 weight percent conjugated diolefin.

3,976,725

HIGH IMPACT STRENGTH THERMOPLASTIC COMPOSITIONS

Gim F. Lee, Jr., Albany, N.Y., assignor to General Electric Company, Pittsfield, Mass.

Division of Ser. No. 183,630, Sept. 24, 1971, Pat. No. 3,819,671. This application Apr. 2, 1974, Ser. No. 457,173
Int. Cl.² C08L 25/06, 25/10
U.S. Cl. 260—892 4 Claims

1. A high impact strength thermoplastic composition consisting essentially of a polyblend of ungrafted particulate rubber dispersed in a polystyrene homopolymer matrix, the polystyrene in said matrix having an intrinsic viscosity of at least about 1.0 deciliter/gram, measured in chloroform at about 30°C, and wherein said rubber comprises from 4 to 20% of the total weight of the composition.

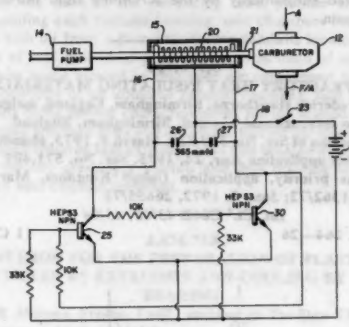
3,976,726

FUEL ACTIVATION APPARATUS

Glen E. Johnson, Denver, Colo., assignor to Electro Fuel, Inc., Pierce, Colo.

Filed Feb. 11, 1974, Ser. No. 441,694
Int. Cl.² F02M 27/04
U.S. Cl. 261—1 12 Claims

1. Activation apparatus for the pretreatment of fuel that is to be combined with oxygen for burning in an exothermic reaction process comprising a power source, a pulsed energy output component connected to said power source and providing radio frequency energy in a frequency range corresponding to a nuclear resonance frequency for at least one elemental constituent of said fuel, an activator unit connected to said output component and disposed in position adjacent the movement path for said fuel to provide a zone of radio frequency interference at frequencies within said frequency range, and means for moving said fuel through said interference zone for the activation thereof prior to its intermixture with oxygen for use in said reaction process.



3,976,727

VENTURI GAS SCRUBBERS FOR SMELTING FURNACES

Harald Krogsrud, Gjettum, Norway, assignor to Elkem-Spigerverket, Oslo, Norway

Continuation of Ser. No. 448,723, March 6, 1974, abandoned, which is a continuation-in-part of Ser. No. 216,109, Jan. 7, 1972, abandoned. This application Feb. 6, 1975, Ser. No. 547,477
Int. Cl.² B01F 3/04
U.S. Cl. 261—116 5 Claims

1. An electric smelting furnace for metallurgical processes and a gas scrubbing system therefor, the first stage of the gas scrubbing system comprising:

a. a vertically positioned venturi tube scrubber which comprises a venturi tube including upstream and downstream frusto-conical portions and a narrowest portion between the ends thereof;

b. at least three openings positioned in said venturi tube operative to permit introduction of scrubbing fluid into the interior of the venturi tube;

c. means for introducing the scrubbing fluid into the interior of the venturi tube comprising at least three circumferentially positioned, elongated tubular nozzles extending at least into said openings, said openings being flush with the walls of the venturi tube and said nozzles not protruding into the interior of the venturi tube;

d. said nozzles comprising an interior elongated narrower tubular portion and an interior upstream wider portion in communication therewith operative to impart directivity to ejected scrubbing fluid which is introduced under pressure in said wider portion; and

e. the nozzles being positioned at an acute angle with respect to the vertical axis of the venturi tube and operative to inject and direct jets of scrubbing fluid to meet in a central spot in the interior of the venturi tube down-

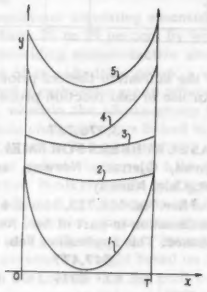
stream from the narrowest part thereof and means to supply the scrubbing fluid at a pressure sufficient so that the requisite velocity of the gases to be scrubbed is imparted substantially by the scrubbing fluid introduced therein.

3,976,728

REFRACTORY HEAT INSULATING MATERIALS

Peter Frederick Hawthorne, Birmingham, England, assignor to Foseco International Limited, Birmingham, England

Continuation of Ser. No. 339,830, March 9, 1973, abandoned. This application Apr. 24, 1975, Ser. No. 571,489
Claims priority, application United Kingdom, Mar. 10, 1972, 11362/72; June 7, 1972, 26655/72
Int. Cl.² C04B 43/02, 43/04
U.S. Cl. 264—26 11 Claims



1. A method of making a shaped article of refractory heat insulating material which comprises forming a homogeneous wet mixture of inorganic refractory fibrous material and binding agent which may be soluble or dispersible in a suitable liquid medium, forming the mixture to the desired shape, drying the shape in a first drying step, impregnating the so-dried shape with binding agent, and drying the shape in a second drying step, one of the drying steps being a drying step which when applied to a homogeneous wet mixture of said fibre and said binder gives a dry product having mechanical properties which are homogeneous between opposed surfaces of the product and the other being a drying step which, when applied to a homogeneous wet mixture of said fibre and said binder, gives a dried product the mechanical properties of which are not homogeneous between opposed surfaces of the product.

3,976,729

PROCESS FOR PRODUCING CARBON FIBERS FROM MESOPHASE PITCH

Irwin Charles Lewis, Lakewood; Edgar Ronald McHenry, and Leonard Sidney Singer, both of Berea, all of Ohio, assignors to Union Carbide Corporation, New York, N.Y.

Filed Dec. 11, 1973, Ser. No. 423,718
Int. Cl.² B29C 25/00
U.S. Cl. 264—29.7 28 Claims

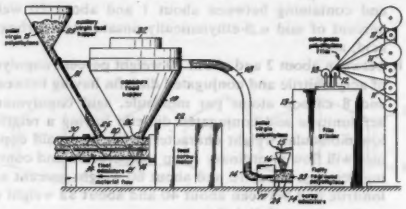
1. In a process for producing a high-modulus, high-strength carbon fiber which comprises spinning a carbonaceous fiber from a nonthixotropic carbonaceous mesophase pitch which under quiescent conditions forms a homogeneous bulk mesophase having large coalesced domains, thermosetting the fiber so produced by heating the fiber in an oxygen containing atmosphere for a time sufficient to redner it infusible, and carbonizing the thermoset fiber by heating it in an inert atmosphere, the improvement which comprises spinning the carbonaceous fiber from a pitch having a mesophase content of from 50 percent by weight to 65 percent by weight wherein less than 50 percent of the molecules in the mesophase portion of the pitch have a molecular weight in excess of 4000 and less than 20 percent of the molecules in the non-mesophase portion of the pitch have a molecular weight of less than 600.

3,976,730

METHOD OF EMPLOYING A HIGH PERCENTAGE OF REGROUND THERMOPLASTIC SCRAP RESIN IN AN EXTRUDER

Darrell D. Cushing, Greenfield, Mass., assignor to Deerfield Plastics Co., Inc., South Deerfield, Mass.

Continuation-in-part of Ser. No. 237,258, March 23, 1972, abandoned. This application Apr. 15, 1974, Ser. No. 460,731
Int. Cl.² B29C 29/00; B29D 3/00
U.S. Cl. 264—37 22 Claims



1. A process for the use of high amounts of a fluffy, low-density, scrap resin in an extruder, which extruder comprises a barrel with a rotating helical lead screw therein and an extruder die at one end thereof, and characterized by a first feed inlet and a second feed inlet downstream of the first feed inlet, which process consisting essentially of:

a. introducing into the first feed inlet of the barrel a fluffy, thermoplastic, scrap resin which tends occasionally to plug the first feed inlet;

b. moving the fluffy scrap resin in the barrel downstream to the second feed inlet by the rotating helical movement of at least one helical screw length of the lead screw;

c. introducing continuously and automatically by gravity feed into the second feed inlet and into the unoccupied volume of the extruder barrel a granular, thermoplastic, virgin resin in pellet form in an amount sufficient to keep the extruder barrel substantially full of resin at all times during the extruder operation when the fluffy resin plugs the first feed inlet, so that, in the event of any blockage of the fluffy resin in the first feed inlet, resin starvation of the extruder die is prevented by the introduction of needed high-density resin into the second feed inlet of the barrel; and

d. extruding the scrap-virgin thermoplastic resin admixture.

3,976,731

METHOD OF DECORATING PLASTIC SURFACE BY TRANSFERABLE IMPRINT

Ales M. Kapral, c/o Akrasil Corp., P.O. Box 409, Menasha, Wis. 54952

Division of Ser. No. 387,543, Aug. 10, 1973, which is a continuation of Ser. Nos. 236,839, March 28, 1972, abandoned, and Ser. No. 359,474, May 11, 1973, abandoned, each is a continuation-in-part of Ser. No. 156,338, June 24, 1971, abandoned. This application Mar. 12, 1975, Ser. No. 557,650
Int. Cl.² B29D 27/04
U.S. Cl. 264—46.4 5 Claims

1. In the method of producing three-dimensional objects of foamed plastic material which comprises the steps of introducing a thermosetting plastic reaction mixture containing a blowing agent into a mold cavity, closing the mold cavity with a cover, and permitting said reaction mixture to foam and cure and blowing agent to form a three-dimensional foamed plastic

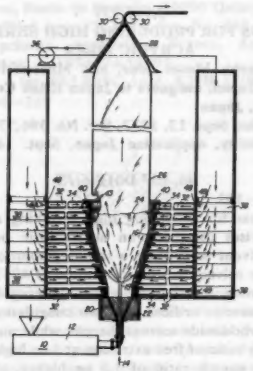
object within said mold, the improvement which comprises attaching a sheet of organic material on the inside of the cover, said sheet having a creped or ridged formation on the surface away from said cover, said surface being coated with a first film of silicone resin and a second film of flexible organic resin both of which conform to the surface of the sheet of organic material, the creped or ridged formation forming a series of valleys or channels running transversely across the sheet wherein the distance between channels is from 0.3 mm. to 4 mm. and the depth of each groove or furrow is from 0.1

mm. to 1.0 mm., whereby entrapped air and other gases within the mold are released to the atmosphere through said valleys or channels while said reaction mixture is transformed into a foamed object which substantially fills said mold, thereby forming a composite foamed plastic object conforming to the interior surfaces of said mold and to the surface of said organic resin film, without voids or bubbles caused by entrapped gases in the mold, the surface of said foamed plastic object being formed of the flexible organic resin film on said sheet of organic material, which film is integrally bonded to said foamed plastic object.

3,976,732
METHOD FOR THE EXTRUSION OF TUBULAR THERMOPLASTIC FILM

F. John Herrington, Holcomb, N.Y., assignor to Mobil Oil Corporation, New York, N.Y.

Filed May 6, 1974, Ser. No. 467,187
The portion of the term of this patent subsequent to May 25, 1993, has been disclaimed.
Int. Cl.² B29D 7/22
U.S. Cl. 264—89 3 Claims

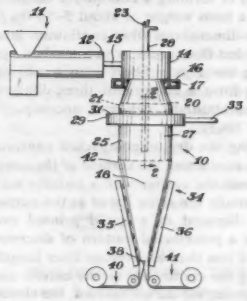


1. A method for the extrusion of tubular-shaped thermoplastic film which comprises extruding molten thermoplastic resin through an annular die orifice in the form of a tube, inflating said tube with air and cooling the tube, to solidify the molten thermoplastic, by passing said tube through a plurality of circular, spaced-apart, openings, said tube beng formed to conform to the shape of said openings and each of said openings being supplied with air under pressure for impingement against the sides of the advancing tube, plenum chambers surrounding each circular opening, said chambers being supplied with air from a plurality of inlet conduits located at the edges of said individual plenum chambers each of said inlet conduits being located so that they are superposed upon the inlet conduits of an adjacent plenum chamber, said circular opening being further characterized by having spaced pairs of diverging aperture rows and means for forcing air through said apertures towards said extruded tube and than away from said tube thereby creating a suction and thus drawing said tube toward said circular openings.

3,976,733
METHOD FOR THE PREPARATION OF PLASTIC ARTICLES BY EXTRUSION AND COOLING BY GAS BEARING

Carl B. Havens, Fresno, Calif., assignor to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 293,825, Oct. 2, 1972, abandoned. This application June 30, 1974, Ser. No. 474,505.
Int. Cl.² B29C 17/04; B29D 23/04
U.S. Cl. 264—89 6 Claims



1. A method for the extrusion of a film forming extrudable thermoplastic synthetic resinous composition, the steps of the method comprising

extruding a heat plastified synthetic resinous film forming composition in the form of a heat plastified tube having generally radial symmetry about the axis of the extrusion,

biaxially stretching the tube and

passing the tube over a generally circular gas bearing having a gas permeable face, the tube being disposed over at least a portion of the gas permeable face, the gas bearing having a diameter greater than the diameter of the tube as initially extruded thereby increasing the diameter of the tube,

supplying from the gas permeable face of the gas bearing a gas at a temperature below the thermoplastic temperature of the tube to thereby cool the tube, subsequently

passing the tube from the gas bearing over a mandrel having a transverse dimension approximating that of the gas bearing,

contacting the inner surface of the tube with an adjacent outer surface of the mandrel to thereby cool the tube and

maintaining the mandrel at a temperature below the thermoplastic temperature of the tube, with the further limitation that at least a major portion of the tube disposed between the extrusion orifice and the gas bearing has at least one generally fructoconical configuration including the step of maintaining the gas pressure between the die and the gas bearing about equal to the pressure external

to the extruded tube to thereby provide a generally blemish free tubular film.

3,976,734

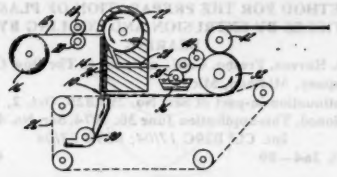
METHOD FOR FORMING AIR FORMED ADHESIVE BONDED WEBS

Charles E. Dunning, and Winterton U. Day, both of Neenah, Wis., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Continuation of Ser. No. 416,383, Nov. 16, 1973, which is a division of Ser. No. 145,485, May 20, 1971, Pat. No. 3,776,807. This application July 7, 1975, Ser. No. 593,560

Int. Cl.² D04H 1/64

U.S. Cl. 264—89 3 Claims



1. A method of forming a continuous airlaid web of wood pulp fibers of a basis weight of about 5–50 lbs./2880 ft.² and having a three-dimensional fiber continuum interrupted by a pattern of bonded fiber areas, which method comprises:

a. air laying wood pulp fibers onto a moving foraminous carrier to form a continuous three-dimensional continuum of substantially dry and uncompacted randomly deposited fibers,

b. transferring the dry, uncompacted continuum from the carrier by contacting the surface of the continuum which is away from the carrier with a transfer member moving at substantially the same speed as the carrier and having adhesive disposed in a liquid printed on the surface thereof in a preselected pattern of discrete spots which are spaced less than an average fiber length apart, while supporting the continuum on the carrier and causing the liquid to penetrate the continuum, the clearance between the transfer member and the carrier being sufficient that the liquid penetrates the continuum without being forced through the continuum to the carrier side thereof, such penetration with the temporary binding effect on the continuum in combination with the preferential attraction of the liquid for the transfer member causing the continuum to transfer, substantially intact, from the carrier to the transfer member, and

c. bonding said continuum by removing the liquid and leaving said adhesive while continuing to support the continuum until the adhesive bonds the fibers at the discrete spots of the preselected pattern.

3,976,735

FABRICATION OF BORON ARTICLES

Samuel T. Benton, Knoxville, Tenn., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Sept. 30, 1974, Ser. No. 510,943

Int. Cl.² B29J 1/00

U.S. Cl. 264—125 3 Claims

1. A powder-metallurgical method for fabricating a boron article having a density greater than 97 percent of the theoretical density of boron and an essentially crack-free finish, comprising the steps of blending amorphous boron powder and carbon powder, cold pressing the resulting boron-carbon blend at a pressure in the range of 2000 to 30,000 psi to form a compact, and thereafter hot pressing the compact at a temperature in the range of 2150° to 2200°C and a pressure in the range of 2000 to 5000 psi to form said article, said carbon being in the blend in an amount effective to inhibit the formation of cracks in the article during the hot pressing step and less than an amount which would provide a major concentration of boron carbide in the article.

3,976,736

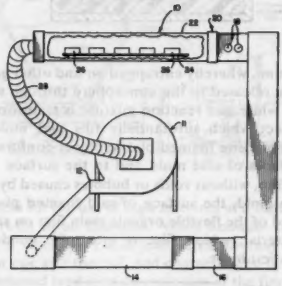
SOAP BAR MANUFACTURE

Wayne H. Paris, Suffern, N.Y.; Ronald C. Wolfe, Wyckoff, N.J.; Terrence P. Fay, Monroe, N.Y., and Robert D. Lindquist, Loveland, Ohio, assignors to Avon Products, Inc., Suffern, N.Y.

Filed Mar. 11, 1974, Ser. No. 450,210

Int. Cl.² B29C 17/00; C11D 13/18, 13/22, 13/28

U.S. Cl. 264—148 4 Claims



1. In a process for continuously forming soap bars having detailed graphics thereon wherein a soap composition is plodded, formed into a continuous ribbon, billeted, shaped, and packaged; the improvement consisting essentially of cooling said billet after shaping and prior to packaging by subjecting the shaped billets to a cooling gas in a confined zone at a velocity thereof and for a time sufficient to harden at least the surface of said billets to substantially resist marring during subsequent packaging.

3,976,737

PROCESS FOR PRODUCING HIGH SHRINKING ACRYLIC FIBER

Hideto Sekiguchi; Masao Sone, and Mitsunori Sato, all of Okayama, Japan, assignors to Japan Exlan Company Limited, Osaka, Japan

Filed Sept. 13, 1973, Ser. No. 396,776

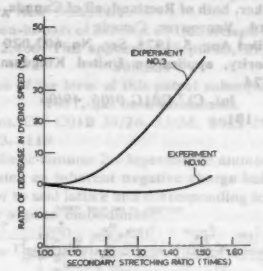
Claims priority, application Japan, Sept. 14, 1972, 47-92344

Int. Cl.² D01F 6/18

U.S. Cl. 264—182 3 Claims

1. A process for producing high shrinking acrylic fibers which comprises dissolving an acrylonitrile polymer in a rhodanide solvent to prepare a spinning solution containing the rhodanide solvent in a concentration of 40–70%, subjecting the spinning solution to a wet-spinning by extruding through spinnerette orifices into two coagulating baths each containing a rhodanide solvent therein, while maintaining the linear velocity ratio of free extrusion at 1 or higher and maintaining a jet stretch ratio of 1.5 or higher, stretching the formed swollen gel fibers to 3–7 times the length in hot water or in a heated steam medium at 80°–120°C, drying the stretched fibers, then subjecting the fibers to a secondary stretch of 1.05 to 1.60 times the length, wherein the first coagulating bath has a rhodanide solvent concentration of 50–70% of that in the spinning solution; said jet stretch ratio

being defined as the quotient obtained by dividing the takeup speed of the coagulated filaments from the coagulating baths



by extrusion linear velocity of the fiber-forming polymer through the spinning orifices.

3,976,738

PROCESS FOR PRODUCING ANTISTATIC ACRYLIC FIBERS

Kunio Tanahashi, and Yukitoshi Nariai, both of Okayama, Japan, assignors to American Cyanamid Company, Stamford, Conn.

Filed Dec. 13, 1973, Ser. No. 424,269
Int. Cl.² D01F 6/18
U.S. Cl. 264—182 5 Claims

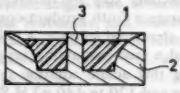
1. A process for producing acrylic fiber having durable antistatic properties which comprises preparing a spinning solution of a fiber-forming acrylonitrile polymer containing at least 40 weight percent acrylonitrile and any balance of one or more ethylenically unsaturated monomers copolymerizable therewith in a suitable solvent therefor, uniformly mixing in said spinning solution a poly(tetrahydrofuran) having a molecular weight of about 500 to 5,000 in an amount from about 1 to 20 weight percent based on the weight of the acrylonitrile polymer, and thereafter spinning the resulting mixture into fiber.

3,976,739

PROCESS FOR MOLDING A PNEUMATIC TIRE HAVING A WIDE BEARING SURFACE

Patrick Carn, Route de Benodet, 29000 Quimper, France

Filed Apr. 22, 1974, Ser. No. 462,647
Claims priority, application France, Apr. 20, 1973, 73.15613; Apr. 4, 1974, 74.11994
Int. Cl.² B29C 5/04; B29H 17/00
U.S. Cl. 264—219 6 Claims



1. A method of molding a pneumatic tire having two axially spaced sidewall portions, said sidewall portions being integrally interconnected by an apertured axial portion, said tire also having a further portion, radially spaced from said apertured axial portion and integrally interconnecting said two spaced sidewall portions, said method comprising:

a. molding in a static mold a pair of axially spaced and interconnected tire sidewall portions from a first curable elastomeric composition and partially curing said elastomeric composition, said sidewall portions being interconnected by an axially apertured portion;

b. inserting said sidewall portions in a second mold;

c. introducing into said second mold a second curable elastomeric composition different from said first curable elastomeric composition and bondable thereto;

d. rotating said second mold to distribute said second curable elastomeric composition in the second mold and to contact said two sidewall portions with said second elastomeric composition and to adhere said second elastomeric composition to said sidewall portions;

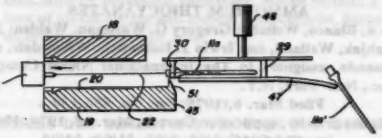
e. curing said first and second elastomeric materials; thereby forming said pneumatic tire.

3,976,740

METHOD OF FORMING A THERMOMETER STRUCTURE

Josef F. Klingler, Wilmette, Ill., assignor to Thermex, Inc., Chicago, Ill.

Division of Ser. No. 883,865, Dec. 10, 1969, Pat. No. 3,689,339. This application Apr. 3, 1972, Ser. No. 240,551
Int. Cl.² B29F 1/14
U.S. Cl. 264—229 12 Claims



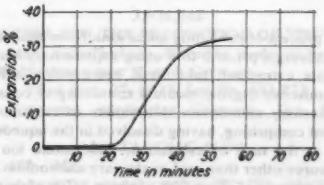
1. A method of forming a thermometer structure comprising the steps of: molding about a taut wire in a cavity an elongated thermoplastic capillary element; urging the molded element on the wire to a position outside the molding cavity; and maintaining a force against the molded element on the wire to transfer the force to the wire as a result of the substantial frictional engagement therebetween to maintain the wire taut during a subsequent molding of a subsequent capillary element about the wire in the cavity.

3,976,741

BUILDING CONSTRUCTION

James N. Lowe, and Earl Gregory, both of Memphis, Tenn., assignors to ISG International Incorporated, Memphis, Tenn.

Filed Oct. 29, 1971, Ser. No. 193,789
Claims priority, application United Kingdom, Nov. 17, 1970, 54650/70
Int. Cl.² B28B 1/16
U.S. Cl. 264—256 12 Claims



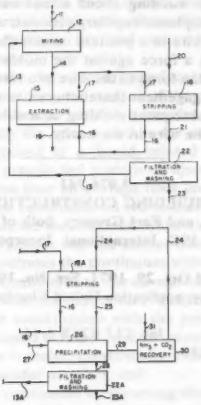
1. A method of making a box-like unit having at least one open side, said method including the steps of preparing a mixture of water and a composition including a hydraulic binding agent consisting at least partly of gypsum, casting said mixture between an external mould defining the external faces of said unit and an internal core having fixed peripheral dimensions defining the internal faces of said unit, at least those surfaces of said core which come into contact with said mixture being covered by a material having a higher coefficient of

heat reflection than those surfaces of said external mould which come into contact with said mixture, the quantity of gypsum in said composition being sufficient to produce an exothermic reaction between said composition and said water which produces a tendency in said mixture to expand outwardly away from the heat reflecting material covering said core, allowing said mixture to set until self-supporting and then promptly removing only said external mould, allowing said mixture to further harden while substantially unrestrained against outward expansion in response to said exothermic reaction until such expansion permits said core to be removed from said mould without altering said peripheral dimensions, and subsequently so removing said internal core through said open side of said unit while said mixture is still so heated by said exothermic reaction, the time which elapses between the start of the removal of said external mould and the start of the removal of said core being greater than the time which elapses between the completion of casting of said mixture and the start of the removal of said external mould.

3,976,742
METAL EXTRACTION PROCESS USING QUATERNARY AMMONIUM THIOCYANATES

Jose A. Blanco, Welland; Gregory G. Wortman, Walden; Juraj Babjak, Welland, and Irwin J. Itzkovitch, Willowdale, all of Canada, assignors to The International Nickel Company, Inc., New York, N.Y.

Filed Mar. 6, 1975, Ser. No. 556,130
Claims priority, application Canada, Mar. 18, 1974, 195212
Int. Cl.² C01G 3/00, 9/00, 51/00, 53/00
U.S. Cl. 423—24 **12 Claims**



1. In a process of extracting metal ions, from aqueous acidic solution having a pH of 2 to 6 using a quaternary ammonium thiocyanate extractant, said metal being extractable into a water immiscible organic medium containing or consisting of said quaternary ammonium thiocyanate extractant, the improvement comprising, having dissolved in the aqueous acidic solution at the time of extraction, thiocyanate ion derived from a source other than said quaternary ammonium thiocyanate in an amount of about 50% to about 110% of that amount stoichiometrically required to combine with said metal ions as defined in moles per liter by the relationship

$$[SCN^-] = \Sigma\, a\, [Me^A]$$

wherein

Σ is the summation operator;

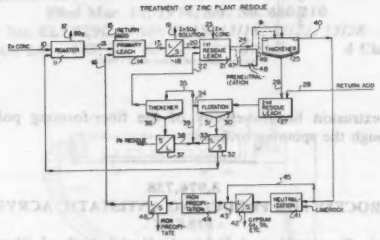
$[Me^A]$ is the molar concentration of any given extractable metal species having the positive valence of A; and

a is a multiplying factor numerically equivalent to A.

3,976,743
TREATMENT OF ZINC PLANT RESIDUE

Louis Landucci, Trail; Donald Roderick McKay, and Ernest George Parker, both of Rossland, all of Canada, assignors to Cominco Ltd., Vancouver, Canada

Filed Aug. 5, 1975, Ser. No. 602,020
Claims priority, application United Kingdom, Sept. 13, 1974, 40112/74
Int. Cl.² C01G 9/06, 49/06
U.S. Cl. 423—101 **20 Claims**



11. A process for the treatment of zinc plant residue formed on leaching zinc calcine with sulphuric acid which comprises: leaching the residue in a first residue leaching step with a sulphuric acid solution containing 120 to 140 g/l H_2SO_4 at atmospheric pressure and a temperature between 60°C and the boiling point of the solution, in the presence of excess zinc sulphide reductant, whereby ferric iron in the residue is reduced to the ferrous state, thereby forming a slurry of zinc sulphate solution containing about 10 to 20 g/l H_2SO_4, about 35 to 45 g/l ferrous iron and other impurities of the group consisting of germanium, indium, gallium, antimony, and arsenic dissolved therein and a mixture of solids containing residue, unreacted zinc sulphide reductant and elemental sulphur; thickening the slurry to separate an overflow of clarified zinc sulphate solution containing said sulphuric acid, ferrous iron and dissolved impurities, from an underflow containing the mixture of solids, leaching the underflow thus obtained in a second residue leaching step with a solution which is substantially higher in acid than the acid solution used in the first residue leaching step at atmospheric pressure and at temperature between 60°C and the boiling point of the solution, the unreacted zinc sulphide reductant from the first residue leaching step providing reducing conditions in said second residue leaching step; treating slurry formed in the second residue leaching step by flotation and liquid-solids separation to separate a froth product comprising unreacted zinc sulphide and elemental sulphur, a tailings product comprising gangue and a lead-containing residue, and an acidic solution; recycling this acidic solution containing zinc sulphate, ferrous iron and 120 to 140 g/l H_2SO_4 to the first residue leaching step; treating at least a portion of the overflow of clarified zinc sulphate solution from the first residue leaching step by oxidizing from about 1 to 7% of the ferrous iron in this portion of the solution; neutralizing this portion of the solution with limerock to about pH 4.5 to precipitate solids containing oxidized iron, gypsum, and said other impurities; separating the precipitated solids from this portion of the zinc sulphate solution; combining this portion with the remainder of the overflow of clarified zinc sulphate solution not so treated; oxidizing ferrous iron in the combined solution to precipitate ferric iron compounds; separating the ferric iron compounds from the resulting zinc sulphate solution; and recovering the zinc sulphate solution.

3,976,744

LAMINAR HEAVY METAL ALUMINOSILICATES

William T. Granquist, Houston, Tex., assignor to NL Industries, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 291,252, Sept. 22, 1972, Pat. No. 3,852,405. This application Sept. 23, 1974, Ser. No. 508,339

The portion of the term of this patent subsequent to Dec. 3, 1991, has been disclaimed.

Int. Cl.² C01B 33/26, 33/28; B01J 29/06

U.S. Cl. 423—118 15 Claims

1. A synthetic laminar 2:1 layer-lattice aluminosilicate mineral possessing an inherent negative charge balanced by cations exterior to said lattice and corresponding to the following formula for a given embodiment:

$$[(G^{3}_{4-ew}\,Y^{2}_{2w})^{VI}(Q^{4}_{8-x}\,R^{3}_{x})^{IV}\,O_{20}(OH)_{4-f}F_{f}]\cdot[d\,C^{y}]$$

where

$2 \leq e < 3$

$0 \leq w \leq 2$

$0 \leq ew \leq 4$

$0 \leq (e-2)w \leq \frac{1}{6}$

$0.05 \leq x < 2$

$f \leq 4$

$0.05 \leq dy \leq 2$

wherein said first bracket represents the average unit cell formulation of said layer lattice and said second bracket represents said charge balancing cations; and wherein

G is selected from the class consisting of trivalent cations having an ionic radius not to exceed 0.75 A and mixtures thereof, provided that G is less than 100 mole percent Al when $w=0$;

Y is selected from the class consisting of divalent cations having an ionic radius not to exceed 0.75 A and mixtures thereof; provided that Y is less than 100 mole percent Mg when $w=2$;

Q is at least 95 mole percent silicon ions, the remainder consisting of tetravalent cations having an ionic radius not to exceed 0.64 A;

R is selected from the group consisting of trivalent cations having an ionic radius not to exceed 0.64 A and mixtures thereor; and

C is at least one charge-balancing cation, with y being its valence and d being the number of such cations C where:

$$dy = x+3(e-2)w.$$

3,976,745

PROCESS FOR REDUCING NITROGEN OXIDES TO NITROGEN

Fumito Nakajima, Hitachi; Masato Tekeuchi, Katsuta; Shimpei Matsuda, Hitachi; Shigeo Uno, Hitachi; Toshikatsu Mori, Hitachi; Yoshihisa Watanabe, and Makoto Imanari, both of Amimachi, all of Japan, assignors to Mitsubishi Petrochemical Company Limited; Hitachi, Ltd. and Babcock-Hitachi K.K., all of Tokyo, Japan

Filed Dec. 10, 1974, Ser. No. 531,309

Claims priority, application Japan, Dec. 12, 1973, 48-137683; Dec. 12, 1973, 48-137684

Int. Cl.³ B01D 53/34

U.S. Cl. 423—239 18 Claims

1. A process for reducing nitrogen oxides to nitrogen, which comprises contacting a gaseous mixture containing nitrogen oxides and molecular oxygen and ammonia with the catalyst composition containing as its chief ingredient;

A. tin as the component A, and

B. at least one metal selected from the group consisting of molybdenum, tungsten, and iron, as the component B,

in the form of an intimate mixture of their oxides, at elevated temperatures.

3,976,746

GRAPHITIC FIBERS HAVING SUPERIOR COMPOSITE PROPERTIES AND METHODS OF MAKING SAME

Irvin Wizon, Huntington Beach, Calif., assignor to Hitco, Irvine, Calif.

Filed June 6, 1974, Ser. No. 477,079

Int. Cl.² C01B 31/07

U.S. Cl. 423—447.8 19 Claims

1. A method of substantially graphitizing carbon material while maintaining a relatively high degree of reactivity in the material comprising the steps of:

subjecting carbonaceous fibrous material which is initially of at least partially carbon composition to a plurality of successive treatments until the material is of substantially graphitic composition, said treatments comprising heating the material to a selected substantially fixed temperature less than 1900° C. in the first treatment and higher than the temperature of preceding treatments in subsequent treatments and concurrently stretching the material relative to the starting length; and

reacting the material during or before one of said treatments with a reactive agent selected from the group consisting of potassium carbonate, cobalt sulfate, a mixture of nickel nitrate and sodium hypochlorite, potassium dichromate and oxalic acid.

3,976,747

MODIFIED DRY LIMESTONE PROCESS FOR CONTROL OF SULFUR DIOXIDE EMISSIONS

Correll C. Shale, and William G. Cross, both of Morgantown, W. Va., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed June 6, 1975, Ser. No. 584,424

Int. Cl.² B01J 8/00; C01B 17/00

U.S. Cl. 423—244 5 Claims

1. A method of desulfurizing flue gas comprising conditioning said flue gas to a temperature no lower than about 100°F and to substantially complete water vapor saturation and contacting the conditioned flue gas with a substantially dry bed of scrubbing medium to cause the condensation of water on the bed, said scrubbing medium comprising pieces of material larger than 1/16 inch said material selected from the group of mono-bi-and trivalent metal carbonates and bicarbonates, to cause sulfur oxides present in said flue gas to react with subsurface molecules of the scrubbing medium forming a layer of reaction products thicker than about 1/32 inch on the scrubbing medium, and periodically removing said reaction products from the scrubbing medium by mechanical means to expose a reactive surface.

3,976,748

PROCESS FOR THE PRODUCTION OF $^{238}PU\ ^{18}O_2$

Werner Lins, Aschaffenburg, Germany, assignor to ALKEM GmbH, Wolfgang near Hanau, Germany

Filed Sept. 27, 1973, Ser. No. 401,273

Claims priority, application Germany, Oct. 9, 1972, 2249424

Int. Cl.² C01G 56/00

U.S. Cl. 423—251 3 Claims

1. A process for manufacturing $^{238}Pu^{18}O_2$ which process comprises contacting plutonium dioxide with a flowing mixture of chloride and carbon tetrachloride at about 600°C to form a gaseous chlorinated plutonium reaction product, said plutonium dioxide containing ^{17}O, ^{18}O oxygen atoms in proportion to ^{18}O atoms of at least half the naturally-occurring ratio of ^{17}O, ^{18}O atoms to ^{18}O atoms, condensing said reaction product to solid phase plutonium trichloride; and oxidizing said solid phase plutonium trichloride by reaction with water in the vapor phase, the oxygen atoms of said water consisting essentially of ^{18}O.

3,976,749

METHOD FOR PRODUCING PURE MONOCARBIDES, MONONITRIDES AND CARBONITRIDES

Horst Wedemeyer, Linkenheim, Germany, assignor to Gesellschaft fur Kernforschung m.b.H, Karlsruhe, Germany

Filed Dec. 21, 1973, Ser. No. 427,426

Claims priority, application Germany, Dec. 22, 1972, 2262868

Int. Cl.² C01G *56/00*; C01F *15/00*; C01G *43/00*; C01R *31/34*

U.S. Cl. 423—251 39 Claims

1. A method of producing pure monocarbides of at least one of the metals titanium, vanadium, zirconium, niobium, molybdenum, hafnium, tantalum, tungsten, thorium, uranium, plutonium, or americium comprising:

a. forming a mixture of carbon with an oxalate of at least one of said metals;

b. decomposing the metal oxalate in the presence of carbon in a stream of a hydrogen containing gas with addition of heat;

c. removing the hydrogen containing gas; and

d. heating the decomposition products immediately after removal of the hydrogen containing gas to an elevated temperature in vacuo to carbothermally reduce the decomposition products and from the monocarbide.

3,976,750

PROCESS FOR THE PRODUCTION OF URANIUM TRIFLUORIDE

Hiroaki Tagawa, Tokaimura, Japan, assignor to Japan Atomic Energy Research Institute, Tokyo, Japan

Filed Dec. 20, 1973, Ser. No. 426,593

Claims priority, application Japan, Dec. 26, 1972, 47-129560

Int. Cl.² C01G *43/06*

U.S. Cl. 423—258 2 Claims

1. A process for the production of uranium trifluoride, comprising heating a mixture of uranium tetrafluoride and uranium nitride selected from the group consisting of uranium mononitride and uranium sesquinitride, at a temperature in the range of 700°C to 1000°C, in a stream of inert gas or under vacuum.

3,976,751

STABILIZATION OF LIQUID SULFUR TRIOXIDE

Anthony W. Yodis, Camillus; Frank J. Kremers, Jordan, and Karol K. Lintern, Camillus, all of N.Y., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed Oct. 21, 1974, Ser. No. 516,716

Int. Cl.² C01B *17/68*, *17/70*

U.S. Cl. 423—271 12 Claims

1. A composition consisting of liquid sulfur trioxide and a stabilizer combination comprising (1) a normally liquid siloxane polymer substituted by a radical selected from the group consisting of methyl and methoxy in which all silicon valences unfilled by said radical are satisfied by hydrogen, in amount of at least about 0.01 percent by weight of the sulfur trioxide, and (2) a methyl ester of an acid of boron, in amount of at least about 0.01 percent by weight, the weight ratio of siloxane polymer to the methyl ester being from about 1:1 to about 10:1, said composition leaving a flowable liquid residue on vaporization of the sulfur trioxide.

3,976,752

MANUFACTURE OF WATER-INSOLUBLE AMMONIUM POLYPHOSPHATE

Hans A. Corver, and Allan J. Robertson, both of St. Catharines, Canada, assignors to American Cyanamid Company, Stamford, Conn.

Filed Nov. 18, 1974, Ser. No. 524,696

Claims priority, application Canada, July 29, 1974, 205882

Int. Cl.² C01B *15/16*, *25/26*

U.S. Cl. 423—305 4 Claims

1. A continuous process for the production of crystalline, water-insoluble ammonium polyphosphate of a pH ranging from about 4.5–6.5 which comprises

(1) admixing either

a. a condensed phosphoric acid of P_4O_5/H_2O mole ratio of at least about 0.155 and a combined ammoniating and condensing agent at a mole ratio of about 1.0–3.0 moles of agent per mole of acid, or

b. urea phosphate and a combined ammoniating and condensing agent at a ratio of about 0.5–1.05 moles of agent per mole of phosphate,

2. heating the resultant admixture to from about 75°–90°C. to form a melt,

3. contacting the resultant melt with a clean endless moving belt which is preheated to a temperature of from about 150°–200°C. to immediately foam the melt,

4. passing the belt having the resultant foam thereon through a zone heated to from about 180° to about 360°C. to cause ammonia gas to evolve therefrom,

5. venting off said ammonia gas at a rate controlled by the measured pH of the resultant ammonium polyphosphate and

6. recovering the resultant crystalline, water-insoluble ammonium polyphosphate of the above pH.

3,976,753

METHOD OF SYNTHESIZING TRIAZANIUM PERCHLORATE MONOHYDRATE

Louis R. Grant, Los Angeles, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Continuation-in-part of Ser. No. 302,372, Oct. 30, 1972, abandoned. This application Sept. 16, 1974, Ser. No. 506,155

Int. Cl.² C01B *21/00*

U.S. Cl. 423—351 1 Claim

1. The method of synthesizing triazanium salts comprising the steps of:

preparing $CH_3SO_2NH_2$ as an aminating agent,

reacting said aminating agent with hydrazine to form triazanium methylsulfonate, and

metathetically reacting said triazanium methylsulfonate, with barium perchlorate to produce triazanium perchlorate monohydrate.

3,976,754

METHOD FOR MAKING CYANOGEN CHLORIDE

Wilhelm Gruber, Darmstadt; Franz Schnierle, Bickenbach, and Guenter Schroeder, Ober-Ramstadt, all of Germany, assignors to Rohm GmbH, Darmstadt, Germany

Filed Aug. 25, 1975, Ser. No. 607,599

Claims priority, application Germany, Sept. 3, 1974, 2442161

Int. Cl.² C01B *21/18*

U.S. Cl. 423—383 2 Claims

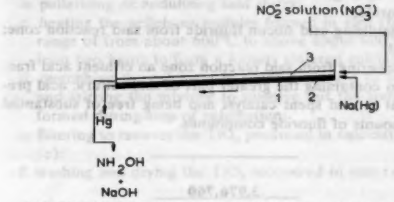
1. A method for making cyanogen chloride which comprises passing an approximately equimolar mixture of dicyan and chlorine over a charcoal catalyst at a temperature between 500°C. and 950°C. at a space velocity between 1000 and 10000 liters, measured at room temperature, per liter of catalyst and per hour.

3,976,755

PROCESS OF REDUCING NITRATE OR NITRILE IONS BY MEANS OF LIQUID AMALGAMS, WITH FORMATION OF HYDROXYLAMINE

Marinus Alfenaar, Schinnen, and Freddie J. Cremers, Stein, both of Netherlands, assignors to Stamicarbon B.V., Geleen, Netherlands

Filed Dec. 26, 1973, Ser. No. 428,306
Claims priority, application Netherlands, Dec. 27, 1972, 7217639
Int. Cl.² C01B 21/20
U.S. Cl. 423—387 10 Claims



1. A process of reducing alkali metal nitrate, alkali metal nitrite or mixtures thereof in an alkaline solution by treating the solution with a liquid alkali metal amalgam to produce hydroxylamine, the process being characterized by reducing said alkali metal nitrite, alkali metal nitrate or mixtures thereof in an aqueous solution of a solvent for said hydroxylamine and said alkali metal nitrate or alkali metal nitrite, said solvent selected from the group consisting of methyl alcohol, ethyl alcohol, propyl alcohol, glycols and glycol ethers with at most 3 carbon atoms.

10. A process of reducing alkali metal nitrate or alkali nitrite in an alkaline solution by treating the solution with a liquid alkali metal amalgam to produce hydroxylamine, the process being characterized by reducing said alkali metal nitrite or alkali metal nitrate in an aqueous solution of $(CH_3)_2SO_2$.

3,976,756

PREPARATION OF HYDRAZINE AND ITS COMPOUNDS

John A. Wojtowicz, Cheshire, Conn., assignor to Olin Corporation, New Haven, Conn.

Filed Oct. 28, 1975, Ser. No. 626,574
Int. Cl.² C07C 109/00; C01B 21/16
U.S. Cl. 423—407 14 Claims

1. A method of preparing azines and hydrazones which comprises, reacting:

a. hypochlorous acid in a non-aqueous solvent;

b. with about 1 to about 100 moles of a nitrogen-contributing compound per mole of hypochlorous acid, said nitrogen-contributing compound having the formula:

R_1NH_2

wherein R_1 is hydrogen or an alkyl radical having about 1 to about 6 carbon atoms; and

c. with about 0.05 to about 20 moles of a carbonyl compound per mole of hypochlorous acid, said carbonyl compound having the formula:

wherein R_2 is selected from hydrogen and alkyl radicals having about 1 to about 6 carbon atoms, and R_3 is selected from alkyl radicals having about 1 to about 6 carbon atoms and aryl radicals having about 6 to about 10 carbon atoms, or R_2 and R_3 together with the carbon atom shown in the above formula form a cycloaliphatic ring having about 3 to about 8 carbon atoms.

3,976,757

METHOD FOR INCREASING THE PRODUCTIVITY OF CHEMICAL REACTORS

John E. Wilkalis, Morris Plains; Charles G. Barbaz, Caldwell, both of N.J., and Horace Q. Trout, Brooklyn, N.Y., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed Aug. 12, 1964, Ser. No. 389,527
Int. Cl.² C01B 7/24
U.S. Cl. 423—466 15 Claims

1. The vapor phase reaction of F_2 with a member selected from the group consisting of ClF_3, Cl_2, BrF_3, Br_2 and SF_4, at elevated pressures and temperatures in a chemical reactor, carried out batch-wise so that reactant gases and product gases are permitted to mix; the improvement which comprises increasing the production capacity of the chemical reactor by raising the temperature of the reactor and contents non-uniformly with respect to position in the reactor so that the reactant and product gases are subjected to different temperature zones depending on their position in the reactor, the temperature of at least one of said zones being high enough to initiate and maintain the reaction therein, the temperature differential between at least two zones of different temperature being at least 3% of the maximum temperature attained in the reactor when measured on the Kelvin scale.

3,976,758

PRODUCTION OF CHLORINE DIOXIDE

Willard A. Fuller, Grand Island, N.Y., assignor to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Filed Mar. 7, 1975, Ser. No. 556,379
Int. Cl.² C01B 11/02; C01D 3/04; C01B 7/03; C01D 5/02
U.S. Cl. 423—478 6 Claims

1. In a process for continuously generating a mixture containing chlorine dioxide, chlorine and sulfate wherein

a. an alkali metal chlorate, an alkali metal chloride and sulfuric acid are continuously reacted in a single vessel generator-evaporator-crystallizer in proportions to generate chlorine dioxide and chlorine;

b. the temperature is maintained within a range of from about 65 to about 85° centigrade;

c. the acidity of the reaction solution is maintained within the range of from about 2 to about 4 normal;

d. the reaction solution is subjected to a vacuum of from about 100 to about 400 millimeters of mercury absolute to effect evaporation of water vapor;

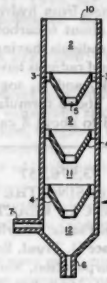
e. chlorine dioxide and chlorine produced by said reaction is withdrawn in admixture with said water vapor, and the reaction is conducted in the presence of at least one catalyst selected from the group consisting of vanadium pentoxiode silver ions, manganese ions, dichromate ions and arsenic ions, and

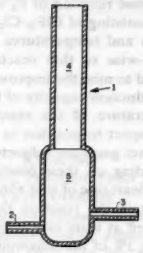
f. neutral alkali metal sulfate is crystallized within said single vessel generator-evaporator-crystallizer and withdrawn therefrom;

the improvement which comprises

continuously passing a slurry containing neutral alkali metal sulfate crystals and chlorate values produced in said single vessel generator-evaporator-crystallizer into the top of a metathesis column, in a downward flow;

countercurrently passing a stream of dilute hydrochloric acid upwardly through said column at a rate and in amounts sufficient to effect reaction with said alkali metal sulfate, converting said alkali metal sulfate to sulfuric acid and alkali metal chloride, continuously returning





chlorate and sulfuric acid values substantially completely to said single vessel generator-evaporator-crystallizer; and

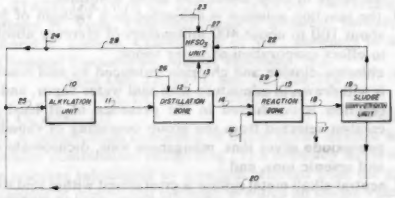
continuously removing alkali metal chloride slurry from the bottom of said metathesis column.

3,976,759

PROCESS FOR REMOVAL OF FLUORIDE COMPOUNDS FROM SPENT ALKYLATION CATALYST

Richard H. Bennett; James W. Brockington, and Lloyd E. Line, Jr., all of Richmond, Va., assignors to Texaco Inc., New York, N.Y.

Filed Dec. 30, 1974, Ser. No. 537,505
Int. Cl.² C01B 7/22, 33/08
U.S. Cl. 423—484 **13 Claims**



1. A process for removal of fluoride compounds from spent alkylation catalyst containing fluorosulfonic acid, organofluoro compounds, and sulfuric acid comprising:

a. subjecting said spent catalyst to distillation, at atmospheric pressure or below, at a temperature in the range of from about 50° to about 120°C. and in admixture with at least the stoichiometric amount of water necessary to hydrolyze said fluorosulfonic acid to hydrogen fluoride and for a period of time sufficient to effect at least partial decomposition of at least some organofluoro compounds in said spent catalyst into hydrogen fluoride and/or fluorosulfonic acid;

b. recovering a first fraction from said distillation, said first fraction comprising primarily hydrogen fluoride;

c. recovering a second fraction from said distillation, said second fraction comprising residual hydrogen fluoride and the greater part of said sulfuric acid present in said spent catalyst;

d. contacting, in a reaction zone, said second fraction with a silica containing material in an amount and for a period of time sufficient to react at least a portion of said residual hydrogen fluoride with said silica to form silicon fluoride;

e. volatilizing said silicon fluoride from said reaction zone; and

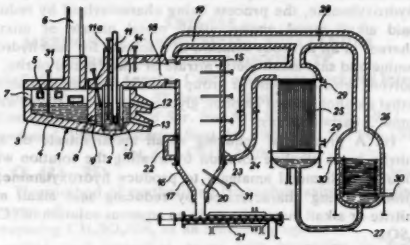
f. recovering from said reaction zone an effluent acid fraction containing the greater part of said sulfuric acid present in said spent catalyst and being free of substantial amounts of fluoride compounds.

3,976,760

CONTINUOUSLY PRODUCING AND RECOVERING METALLIC CHLORIDES

Henry Toussaint, La Varenne Saint Hilaire, France, assignor to Le Nickel, Paris, France

Filed Jan. 22, 1974, Ser. No. 435,513
Int. Cl.² C01G 53/08, 51/08; C01B 17/06, 49/10
U.S. Cl. 423—493 **3 Claims**



1. A method of continuously producing and recovering metallic chlorides, comprising melting an impure nickel matte in a melting zone, removing the melted product from the bottom of the melting zone, conveying the melted product to a separate chlorination zone sealed from the atmosphere, continuously injecting gaseous chlorine into the melted product in the chlorination zone, maintaining the melted product in the chlorination zone at a temperature such that at least one metal chloride is produced in the vapour phase, discharging the at least one metal chloride into a condensation zone, diluting and cooling the at least one metal chloride in the condensation zone in a continuous flow of cooling gas consisting of sulphur vapour at a temperature and rate of flow such that the temperature is lower than the melting point of the at least one metal chloride and the at least one metal chloride is thereby condensed, collecting the condensed metal chloride and continuously cooling and recycling the cooling gas to dilute and cool further quantities of chloride vapour.

3,976,761
PREPARATION OF TiO_2 AND ARTIFICIAL RUTILE FROM SODIUM TITANATE

John M. Gomes, and Daniel A. O'Keefe, both of Reno, Nev., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Aug. 14, 1974, Ser. No. 497,446
Int. Cl.² C01G 23/08; C01D 3/04, 5/00
U.S. Cl. 423—610 4 Claims

1. A method for producing TiO_2 from sodium titanate which consists essentially of:

a. admixing with said sodium titanate a greater than stoichiometric amount of a dilute aqueous acid selected from the group consisting of sulfuric acid and hydrochloric acid to form a thick slurry;

b. pelletizing or nodulizing said slurry;

c. heating the pellets or nodules formed in step (b) in the range of from about 600°C to above about 900°C for at least two hours to form a loosely sintered calcinate;

d. quenching the calcinate in water causing it to break up and stirring the mixture to dissolve out the sodium salt formed during step of calcination;

e. filtering to recover the TiO_2 produced in calcination step (c);

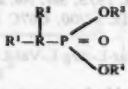
f. washing and drying the TiO_2 recovered in step (e).

3,976,762
MULTI-ORGAN TECHNETIUM COMPLEXES PRODUCTION AND USE THEREOF

Günter A. Köhler, Grant Township, Washington County, and Gary M. Pestel, Mahtomedi, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed July 5, 1974, Ser. No. 485,839
Int. Cl.² A61K 43/00; G21H 5/02
U.S. Cl. 424—1 20 Claims

1. A process for preparing a radiopharmaceutical comprising reducing a solution comprising at least 0.01 but not more than 500 millicuries per milliliter of 99m-pertechnetate ion until at least 50 mole percent of said 99m-pertechnetate ion has been reduced to a 99m-technetium species having an oxidation state greater than zero, but less than +7, and reacting said 99m-technetium species with a molar excess of a phosphonic acid complexing agent of the formula.



wherein R is an alkylene radical having 1 to 6 carbon atoms; R^3 and R^4 are either H or an alkyl radical having 1 to 3 carbon atons; R^1 is H or NH_2, except when R^1 is NH_2, then R^3 and R^4 are H; and R^2 is H, NH_2 or halogen, except when R^2 is NH_2, then R^3 and R^4 are H, and when R^2 is halogen, then R^1 is H.

3,976,763
CHLORPROMAZINE ASSAY

Sidney Spector, Livingston, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Apr. 30, 1975, Ser. No. 573,227
Int. Cl.² G01N 33/00; A61K 39/00
U.S. Cl. 424—1.5 9 Claims

1. An antigen consisting essentially of chlorpromazine covalently bonded to an immunogenic carrier material through a diazo containing linking group.

7. A method for the assay of chlorpromazine in a sample, which method comprises mixing said sample with a known amount of labeled chlorpromazine compound and an antibody which will selectively complex with said chlorpromazine compound, measuring the degree of binding of said labeled chlorpromazine compound with said antibody, and determining the amount of chlorpromazine present in said sample by comparing said degree of binding to a standard curve obtained by mixing known amounts of chlorpromazine compound with fixed amounts of said labeled chlorpromazine compound and said antibody and determining the degree of binding for each known amount of said chlorpromazine compound.

3,976,764
SOLID THERAPEUTIC PREPARATION REMAINING IN STOMACH

Sumio Watanabe; Masanori Kayano, both of Honjo; Yoshio Ishino, Kumagaya, and Kohei Miyao, Tokyo, all of Japan, assignors to Eisai Co., Ltd., Tokyo, Japan

Filed Mar. 11, 1975, Ser. No. 557,408
Claims priority, application Japan, Mar. 12, 1974, 49-27673
Int. Cl.² A61K 9/22
U.S. Cl. 424—19 9 Claims

1. A solid therapeutic preparation adapted to be taken internally, which preparation is floatable in the gastric juices in the stomach and is characterized by remaining in the stomach for a long period of time while gradually releasing a therapeutically active ingredient contained therein into the gastric juices of the stomach, said preparation consisting essentially of a hollow pharmaceutically acceptable globular shell conventionally employed for internal therapeutic use containing coated on the external surface thereof an under-coating and a final coating, said under-coating being a layer of a cellulose acetate-phthalate copolymer and said final coating being a layer of ethyl-cellulose and hydroxylpropyl cellulose in combination with an effective amount of a pharmaceutically active ingredient selected from the group consisting of a gastric acid secretion inhibitor, a gastric acid neutralizer and an anti-pepsin inhibitor.

3,976,765
ANTIBACTERIAL ORAL PREPARATIONS

Julius Harvey Nachtigal, Colonia, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Continuation-in-part of Ser. No. 411,723, Nov. 1, 1973, abandoned. This application Dec. 12, 1974, Ser. No. 531,889
Int. Cl.² A61K 7/22
U.S. Cl. 424—54 16 Claims

1. An oral composition comprising a bis-biguanido hexane in amount of about 0.001–5% by weight based on the free base thereof about 0.05–12% by weight of a nonionic polyoxyethylene-polyoxypropylene block copolymer surfactant, a foam booster selected from the group consisting of alkyl dimethyl amine oxides wherein the alkyl group contains from about 10 to about 18 carbon atoms and monoethanolamides of fatty acids having from about 10 to about 18 carbon atoms, the ratio of said nonionic surfactant to said foam booster being from about 3:2 to about 4:1 by weight, and a suitable vehicle.

3,976,766

ARTIFICIAL ROUGHAGE MATERIALS

Robert H. Salvesen, Clark; Paul L. Malloy, Westfield, both of N.J.; Erle E. Bartley, Manhattan, and RoNel M. Meyer, St. George, both of Kans., assignors to Exxon Research and Engineering Company, Linden, N.J.

Division of Ser. No. 291,536, Sept. 25, 1972, Pat. No. 3,876,793, which is a division of Ser. No. 134,891, April 16, 1971, abandoned. This application July 29, 1974, Ser. No. 492,780

The portion of the term of this patent subsequent to Apr. 8, 1992, has been disclaimed.

Int. Cl.² A61K *31/745*

U.S. Cl. 424—83 7 Claims

1. A method for aiding digestion in a ruminant animal which comprises feeding to said ruminant animal in conjunction with an animal feed an effective rumination promoting amount of an inert, elastomeric, plastomeric, or plastic elastomeric polymer selected from the group consisting of an elastomeric or plastomeric copolymer of ethylene and an alpha olefin, a copolymer of ethylene and vinyl acetate and a blend of a plastic polyethylene with an elastomeric ethylene propylene copolymer said polymer having a tensile strength at yield of between about 400 to about 1500 pounds per square inch, a hardness of less than 40 on the Shore D hardness scale and a tensile strength at 300% elongation of between about 450 to about 1200 pounds per square inch.

3,976,767

PURIFICATION OF HEPATITIS B SURFACE ANTIGEN BY CHROMATOGRAPHY ON AGAROSE CONTAINING AMINOALKYL RESIDUES

A. Robert Neurath, New York, N.Y., assignor to The New York Blood Center, New York, N.Y.

Filed Apr. 14, 1975, Ser. No. 568,093

Int. Cl.² A61K *39/12*; C12K *5/00*

U.S. Cl. 424—89 7 Claims

1. A process for separating hepatitis B surface antigen from a mixture containing the same, which comprises passing said mixture over an agarose gel containing C_9 or C_{10} terminal aminoalkyl groups to thereby deposit on said gel said hepatitis B surface antigen while allowing other components of said mixture to pass therethrough and thereafter eluting said hepatitis B surface antigen by passing eluting agent comprising an aqueous solution of chaotropic ions present in said solution at a concentration lower than that at which the antigen will become denatured over said agarose gel.

3,976,768

FORTIMICIN A

Takashi Nara, Tokyo; Seigo Takasawa, Hadano; Ryo Okachi, Machida; Isao Kawamoto, Machida; Mitsuyoshi Yamamoto, Machida; Seiji Sato, Machida, and Tomoyasu Sato, Machida, all of Japan, assignors to Abbott Laboratories, North Chicago, Ill.

Filed July 22, 1974, Ser. No. 490,668

Claims priority, application Japan, July 23, 1973, 48-80866

Int. Cl.² A61K *35/00*

U.S. Cl. 424—118 1 Claim

1. The antibiotic Fortimicin A characterized by:

(a) a molecular weight of 405;

(b) the molecular formula of $C_{17}H_{35}N_5O_6$;

(c) an ultraviolet absorption spectrum essentially as shown in FIG. 1; and

(d) an infrared absorption spectrum essentially as shown in FIG. 2 or its pharmaceutically acceptable acid salts.

3,976,769

PESTICIDAL COMPOSITIONS CONTAINING PHOSPHORIC ESTERS AND DIVALENT SULPHUR COMPOUNDS

Claude Hennart, Aubervilliers, France, assignor to Airwick Industries, Inc., Carlstadt, N.J.

Division of Ser. No. 180,137, Sept. 13, 1971, Pat. No. 3,836,643. This application Mar. 14, 1974, Ser. No. 451,381

Claims priority, application France, Sept. 11, 1970, 70.33014

Int. Cl.² A01N *9/36*

U.S. Cl. 424—175 7 Claims

1. An insecticidal composition on a fibrous porous support, said composition consisting essentially of

I. about 5 to 99.5%, based on the weight of the composition, of an insecticidal phosphoric ester which partially decomposes by protonization displacement of a lower alkyl group of said phosphoric ester in favor of a hydrogen atom as a result of contacting said phosphoric acid ester with molecules of water, when exposing said ester to atmospheric humidity, thereby inhibiting said ester from being able to act against insects and which is a di(C_1–C_3 alkyl) dihalogenovinyl phosphate; a di(C_1–C_3 alkyl)-dihalogenomethyl-1-vinyl phosphate; or a tetrahalogeno (C_2 or C_3 alkyl) di(C_1 or C_2 alkyl) phosphate, wherein the halogen substituents are chlorine or bromine;

II. about 0.05 to 10%, based on the weight of the phosphoric ester, of a sulphur-containing compound which effectively stabilizes the said pesticidal phosphoric acid ester against decomposition by protonization and having at least one divalent sulphur atom and said sulphur-containing compound having between 5 and 99% by weight of sulphur, based on the weight of the compound; and

III. 0 to about 50%, based on the weight of the composition, of one or more inert mineral or organic adjuvants compatible with the phosphoric ester.

3,976,770

SAR'-(OME)THR⁸ ANGIOTENSIN II AS AN ANGIOTENSIN II ANTAGONIST

Francis Merlin Bumpus, 75 Winterberry Lane, Chagrin Falls, Ohio 44022; Mahesh Chandra Khosla, 7415 Warwick Lane, Chesterland, Ohio 44026, and Robert Rudolph Smeby, 36801 Riviera Road, Willoughby, Ohio 44094

Filed Feb. 10, 1975, Ser. No. 548,328

Int. Cl.² A61K *37/00*; C07C *103/52*

U.S. Cl. 424—177 4 Claims

1. The octapeptide Sar-L-Arg-L-Val-L-Tyr-L-Ile-L-His-L-Pro- -(OMe)Thr.

2. A composition suitable for parenteral administration to a warm-blooded animal consisting essentially of the octapeptide of claim 1 dissolved in a liquid, pharmaceutically acceptable vehicle suitable for injection into warm-blooded animals, said octapeptide being present at a concentration of between 50 and 6000 ng/ml of said vehicle.

3,976,771

GLYCYLGLYCINE AMIDE PREPARATIONS AND METHOD OF USE ANTIARRHYTHMIC

Ulf Hendrik Anders Lindberg, and Sven Bengt Arvid Akerman, both of Sodertalje, Sweden, assignors to Astra Lakemedel Aktiebolag, Sodertalje, Sweden

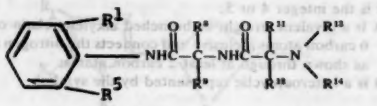
Division of Ser. No. 331,899, Feb. 12, 1973, Pat. No. 3,910,871. This application June 13, 1975, Ser. No. 586,636

Claims priority, application United Kingdom, Feb. 15, 1972, 6943/72

Int. Cl.² A61K *37/00*

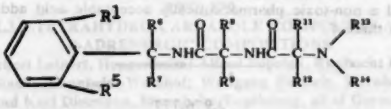
U.S. Cl. 424—177 18 Claims

1. A pharmaceutical preparation for treating cardiac arrythmias containing as an active substance in an amount effective to treat symptoms of cardiac arrythmias, a compound having the structural formula



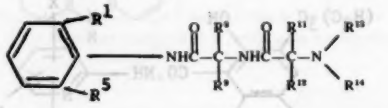
or a pharmaceutically acceptable acid addition salt thereof, wherein R^1 and R^5 are the same or different and selected from the group consisting of hydrogen, methyl, and halogen; R^8, R^9, R^{11} and R^{12} are the same or different and selected from the group consisting of hydrogen and methyl; R^{13} and R^{14} are the same or different and selected from the group consisting of hydrogen and lower alkyl radicals having from 1 to 3 carbon atoms, together with a pharmaceutically acceptable carrier.

6. A pharmaceutical preparation for treating cardiac arrythmias containing as an active substance in an amount effective to treat symptoms of cardiac arrythmias a compound having the structural formula



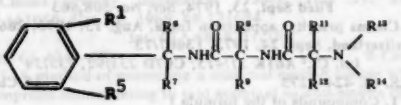
or a pharmaceutically acceptable acid addition salt thereof, wherein R^1 and R^5 are the same or different and selected from the group consisting of hydrogen, methyl, and halogen; R^6, R^7, R^8, R^9, R^{11} and R^{12} are the same or different and selected from the group consisting of hydrogen and methyl; R^{13} and R^{14} are the same or different and selected from the group consisting of hydrogen and lower alkyl radicals having from 1 to 3 carbon atoms, together with a pharmaceutically acceptable carrier.

10. A method for treating cardiac arrythmias in mammals characterized by the administration to a subject suffering from symptoms of cardiac arrythmias of a compound having the structural formula



or a pharmaceutically acceptable acid addition salt thereof, wherein R^1 and R^5 are the same or different and selected from the group consisting of hydrogen, methyl, and halogen; R^8, R^9, R^{11} and R^{12} are the same or different and selected from the group consisting of hydrogen and methyl; R^{13} and R^{14} are the same or different and selected from the group consisting of hydrogen and lower alkyl radicals having from 1 to 3 carbon atoms; in an amount effective to mitigate said symptoms.

15. A method for treating cardiac arrythmias in mammals characterized by the administration to a subject suffering from symptoms of cardiac arrythmias of a compound having the structural formula



or a pharmaceutically acceptable acid addition salt thereof, wherein R^1 and R^5 are the same or different and selected from the group consisting of hydrogen, methyl, and halogen; R^6, R^7, R^8, R^9, R^{11} and R^{12} are the same or different and selected from the group consisting of hydrogen and methyl; R^{13} and R^{14} are the same or different and selected from the group consisting of hydrogen and lower alkyl radicals having from 1 to 3 carbon atoms; in an amount effective to mitigate said symptoms.

3,976,772

INSECTICIDAL SULFONIUM SALTS

Steven A. Roman, Oakdale, Calif., assignor to Shell Oil Company, Houston, Tex.

Filed June 2, 1975, Ser. No. 582,576

Int. Cl.² A01N 9/22; C07D 265/30

U.S. Cl. 424—248 **5 Claims**

1. A sulfonium salt of the formula:

wherein R^1 is alkyl of from 1 to 3 carbon atoms, R^2 is alkyl of from 1 to 10 carbon atoms and Y is an anion selected from the group consisting of chloride, bromide, iodide, alkyl sulfate, fluorosulfonate and fluoborate.

3,976,773

PIPERAZINE DIONES

Adrian Charles Ward Curran, Newcastle-upon-Tyne, England, assignor to John Wyeth & Brother Limited, Maidenhead, England

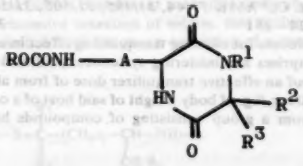
Filed Mar. 14, 1975, Ser. No. 558,575

Claims priority, application United Kingdom, Mar. 19, 1974, 12051/74

Int. Cl.² C07D 295/00

U.S. Cl. 424—250 **8 Claims**

1. A compound having the formula:



wherein R represents a benzyl, phenethyl, or 3-phenyl propyl group in which the phenyl portion may be mono-substituted by fluorine, chlorine, bromine, methyl, ethyl, propyl, butyl, methoxy, ethoxy, propoxy, or butoxy; A represents a methylene, ethylene, propylene, or butylene group; R^1 represents hydrogen, methyl, ethyl, n-propyl, isopropyl or n-butyl; and R^2 and R^3 independently represent hydrogen, methyl, ethyl, or n-propyl.

3,976,774

ANTIEMETIC METHOD

Alvin C. Conway, North St. Paul, Minn., assignor to Riker Laboratories, Inc., Northridge, Calif.

Filed June 2, 1975, Ser. No. 583,041
Int. Cl.² A61K *31/495*
U.S. Cl. 424—250 5 Claims

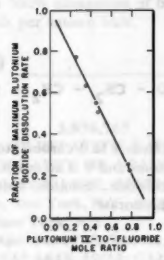
1. A method of preventing emesis in mammals which comprises administering to mammals in need thereof an effective amount of a compound selected from the group consisting of anti-8-N-methylpiperazinyl-N'-carbonyldibenzobicyclo[3.2.1]-octadiene and a pharmaceutically acceptable acid addition salt thereof.

3,976,775

METHOD FOR DISSOLVING PLUTONIUM DIOXIDE

Othar K. Tallent, Oak Ridge, Tenn., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed May 6, 1975, Ser. No. 574,977
Int. Cl.² B01F *1/00*
U.S. Cl. 423—251 1 Claim



1. A method of bringing PuO_2 into aqueous solution comprising adding Ag_2O_2 to an aqueous dissolving mixture comprising PuO_2, HNO_3, and an effective catalytic amount of fluoride.

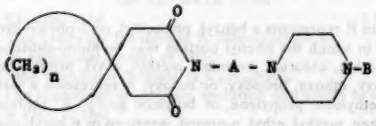
3,976,776

TRANQUILIZER PROCESS EMPLOYING N-(HETEROARCYCLIC)PIPERAZINYLALKYLAZASPIROALKANEDIONES

Yao Hua Wu, and James W. Rayburn, both of Evansville, Ind., assignors to Mead Johnson & Company, Evansville, Ind.

Division of Ser. No. 312,543, Dec. 6, 1972, Pat. No. 3,907,801, which is a division of Ser. No. 879,604, Nov. 24, 1969, Pat. No. 3,717,634. This application July 14, 1975, Ser. No. 595,467
Int. Cl.² A61K *31/44*, *31/495*, *31/505*, *31/50*
U.S. Cl. 424—251 38 Claims

1. The process for eliciting tranquilizing effect in a mammal which comprises administering systemically to a mammal in need thereof an effective tranquilizer dose of from about 0.01 to about 40 mg./kg. of body weight of said host of a compound selected from a group consisting of compounds having the formula:

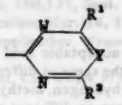


wherein

n is the integer 4 or 5;

A is a divalent straight or branched alkylene chain of 2 to 6 carbon atoms inclusive and connects the nitrogen atoms as shown through at least 2 carbon atoms;

B is a heteroarcyclic represented by the symbol



W and Y are independently selected from the group consisting of CH and nitrogen,

R^1 and R^2 are independently selected from the group consisting of hydrogen, lower alkyl from 1 to 4 carbon atoms inclusive, lower alkoxy of from 1 to 4 carbon atoms inclusive, hydroxy, amino, alkylthio of from 1 to 4 carbon atoms inclusive, halogen, trifluoromethyl, alkanoamido of 1 to 6 carbon atoms inclusive, and alkanesulfonamido of 1 to 6 carbon atoms inclusive,

and a non-toxic pharmaceutically acceptable acid addition salt thereof.

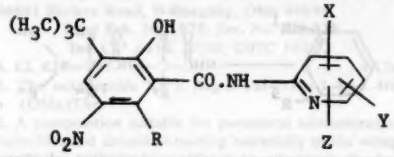
3,976,777

SALICYLAMIDES AND COMPOSITIONS THEREOF

Richard Martin Lee, Ickleford, and George Sidney Sach, Welwyn, both of England, assignors to Smith Kline & French Laboratories, Inc., Welwyn Garden City, England

Division of Ser. No. 415,205, Nov. 12, 1973, Pat. No. 3,917,625. This application July 16, 1975, Ser. No. 596,485
Claims priority, application United Kingdom, Dec. 6, 1972, 56234/72
Int. Cl.² A61K *31/44*
U.S. Cl. 424—263 6 Claims

1. A veterinary composition for anti-parasitic use comprising an acceptable diluent or carrier and as an active ingredient an effective but nontoxic quantity of a salicylamide compound of the formula:



wherein R is hydrogen or lower alkyl; and X, Y and Z, which may be the same or different, are hydrogen, halogen, lower alkyl, lower alkoxy, nitro, or carbalkoxy; provided that X, Y and Z are not simultaneously all hydrogen.

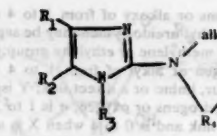
3,976,778

IMIDAZOLES AND PROCESSES FOR THEIR PRODUCTION

Kuppuswamy Nagarajan; Vishwa Prakash Arya, and Thomas George, all of Bombay, India, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Sept. 23, 1974, Ser. No. 508,603
Claims priority, application India, Aug. 13, 1973, 266/73; Switzerland, Sept. 24, 1973, 13667/73
Int. Cl.² A61K *31/415*; C07D *233/92*, *233/54*
U.S. Cl. 424—273 18 Claims

1. Compounds of the formula I



(I),

wherein one of the groups R_1 and R_2 is a hydrogen or lower alkyl and the other a nitro group, R_3 is a lower alkyl, hydroxy-lower alkyl, lower-alkoxy-lower-alkyl, lower-alkylsulphonyl-lower-alkyl or amino-lower-alkyl, R_4 is an oxo or thioxo group, X is a carbonyl or thiocarbonyl group and R_5 when X is a carbonyl group is a lower alkoxy, amino, loweralkylamino, or diloweralkylamino group, and when X is a thiocarbonyl group R_5 is a lower alkyl, aryl, amino, alkylamino or diloweralkylamino group and alk is 1,2-ethylene, their N-oxides and pharmaceutically acceptable salts.

3,976,779

1,2,3,4-TETRAHYDRO-CARBAZOLE COMPOUNDS AND β-ADRENERGIC COMPOSITIONS

Herbert Leinert, Heppenheim; Alfred Popelak, Rimbach; Kurt Stach, Mannheim-Waldhof; Wolfgang Bartsch, Viernheim, and Karl Dietmann, Mannheim-Vogelstang, all of Germany, assignors to Boehringer Mannheim G.m.b.H., Mannheim-Waldhof, Germany

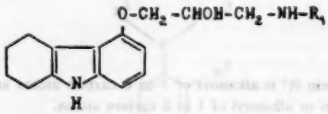
Filed Apr. 16, 1975, Ser. No. 568,743

Claims priority, application Germany, May 21, 1974, 2424523

Int. Cl.² A61K 31/40

U.S. Cl. 424—274 13 Claims

1. 1,2,3,4-Tetrahydro-carbazole compound of the formula:



(I),

wherein R^1 is straight-chained or branched alkyl of up to 8 carbon atoms, or a pharmacologically compatible salt thereof.

3,976,780

METHODS OF PROTECTION AGAINST EMESIS IN MAMMALS BY ADMINISTRATION OF A 3-ALKOXY-THIANAPHTHENE-2-CARBOXAMIDE

Michel Leon Thominet, Paris, France, assignor to Societe d'Etudes Scientifiques et Industrielles l'Ile-de-France, Paris, France

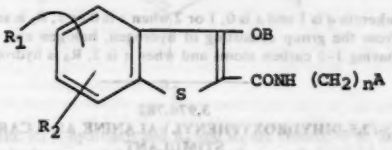
Division of Ser. No. 348,189, April 5, 1973, Pat. No. 3,862,320, which is a continuation-in-part of Ser. No. 140,605, May 5, 1971, Pat. No. 3,745,175, which is a continuation-in-part of Ser. No. 845,509, July 28, 1969, abandoned. This application Jan. 6, 1975, Ser. No. 538,805

Claims priority, application France, July 29, 1968, 68.161060; Oct. 28, 1968, 68.171684

Int. Cl.² A61K 31/38

U.S. Cl. 424—275 8 Claims

1. A method of protecting a mammal against emesis which comprises administering to said mammal an anti-emesis effective amount of a compound selected from the group consisting of a 3-alkoxy-thianaphthene-2-carboxamide, the dioxides thereof, the pharmaceutically acceptable acid addition salts and quaternary ammonium salts thereof, said 3-alkoxy-thianaphthene-2-carboxamide having the formula:



in which R_1 and R_2 are the same or different and are hydrogen, lower alkoxy, halogen, nitro or amino; B is lower alkyl or allyl; n is 1, 2 or 3; and A is mono lower alkylamino or di lower alkylamino.

3,976,781

PROCESS AND COSMETIC COMPOSITIONS FOR THE TREATMENT OF SKIN AND SCALP

Gregoire Kalopissis, Paris, France, assignor to L'Oreal, Paris, France

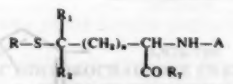
Division of Ser. No. 203,046, Nov. 29, 1971, Pat. No. 3,849,576, which is a continuation-in-part of Ser. No. 736,960, June 14, 1968, abandoned, which is a continuation-in-part of Ser. Nos. 427,976, Jan. 25, 1965, abandoned, and Ser. No. 602,480, Dec. 19, 1966, abandoned. This application Aug. 29, 1974, Ser. No. 501,615

Claims priority, application France, Jan. 29, 1964, 64.961897; Luxemburg, Dec. 22, 1965, 50125; France, June 21, 1967, 67.111396; July 28, 1967, 67.116160; Luxemburg, Jan. 29, 1968, 55371; Feb. 23, 1968, 55553; Apr. 19, 1969, 55935; Belgium, June 3, 1969, 74877; Luxemburg, Feb. 19, 1969, 58042; May 12, 1969, 58634; Apr. 23, 1971, 63056; Apr. 23, 1971, 63057

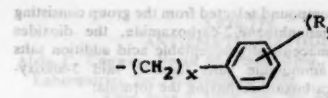
Int. Cl.² A61K 31/24

U.S. Cl. 424—309 14 Claims

1. A cosmetic composition for topical application to a human's scalp and skin characterized by an excessive secretion of sebum to improve the condition thereof by reducing said excessive secretion of sebum comprising a non-toxic cosmetic carrier suitable for topical application to the scalp or skin and a non-toxic active component present in amounts effective to reduce excessive secretion of sebum, said active component being selected from the group consisting of a compound having the formula:



wherein n is 0 or 1 and when n is 0, R_1 and R_2 are selected from the group consisting of hydrogen and CH_3, and when n is 1, R_1 and R_2 are hydrogen; R_7 is selected from the group consisting of hydroxy and alkoxy containing 1–5 carbon atoms, and R is selected from the group consisting of $-C(C_6H_5)_3$, $-CH(C_6H_5)_2$, $-C(CH_3)_2$ (C_6H_4p $-$ OCH_3.), $-(CH_2)_z-R_8$ wherein z is 0 or 1 and R_8 is selected from the group consisting of naphthyl-1 and naphthyl-2 and



wherein q is 1 and x is 0, 1 or 2 when x is 0 or 1, R_9 is selected from the group consisting of hydrogen, halogen and alkoxy having 1–5 carbon atoms and when x is 2, R_9 is hydrogen.

3,976,782

3-(2,5-DIHYDROXYPHENYL)-ALANINE AS A CARDIAC STIMULANT

Walfred S. Saari, Lansdale, Pa., assignor to Merck & Co., Inc., Rahway, N.J.

Filed Mar. 25, 1975, Ser. No. 561,822
Int. Cl.² A61K 31/195
U.S. Cl. 424—319 4 Claims

1. A method for the treatment of heart failure which comprises administering to an animal afflicted with heart failure an effective amount of 3-(2,5-dihydroxyphenyl)-alanine.

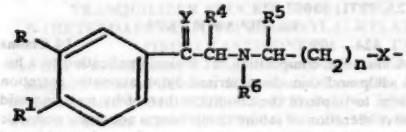
3,976,783

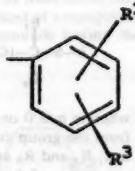
METHOD OF STIMULATING THE HEART EMPLOYING UREIDO SUBSTITUTED PHENYL-ALKANOLAMINE, ALKYLAMINE AND α-AMINOALKYL KETONE DERIVATIVES

David A. Cox, Canterbury; Ian T. Barnish, Ramsgate, and Anthony G. Evans, Westgate-on-Sea, all of England, assignors to Pfizer Inc., New York, N.Y.

Division of Ser. No. 160,529, July 7, 1971, Pat. No. 3,816,516.
This application Feb. 15, 1974, Ser. No. 443,034
Claims priority, application United Kingdom, July 18, 1970, 34931/70
Int. Cl.² A61K 31/17
U.S. Cl. 424—322 2 Claims

1. A method of stimulating the heart in animal subjects suffering from congestive heart failure which comprises the administration thereto of an effective amount of a compound selected from the group consisting of a compound having the formula:





wherein R and R^1 are each hydrogen or hydroxy with the priviso that at least one is hydroxy; R^2 is hydrogen, alkyl of from 1 to 4 carbon atoms or alkoxy of from 1 to 4 carbon atoms; R^3 is ureido or methyl ureido, which may be separated from he phenyl ring by a methylene or ethylene group; R^4, R^5, and R^6 are each hydrogen or alkyl of from 1 to 4 carbon atoms; X is oxygen, sulfur, imino or a direct link; Y is hydrogen and hydroxy, two hydrogens or oxygen; n is 1 to 3 when X is other than a direct link and is 0 to 4 when X is a direct link; and a salt thereof with a pharmaceutically acceptable acid.

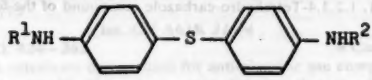
3,976,784

METHOD OF TREATMENT OF LIVER FLUKE INFECTIONS

Gerald Christopher Coles, and Justus Kenneth Landquist, both of Macclesfield, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Jan. 16, 1975, Ser. No. 541,694
Claims priority, application United Kingdom, Feb. 4, 1974, 5014/74
Int. Cl.² A61K 31/165
U.S. Cl. 424—324 3 Claims

1. A method for the treatment of a sheep infected with immature liver flukes which comprises orally administering to said sheep an amount effective for eradicating said immature liver flukes of a compound of the formula:



wherein R^1 is alkanoyl of 1 to 6 carbon atoms and R^2 is hydrogen or alkanoyl of 1 to 6 carbon atoms.

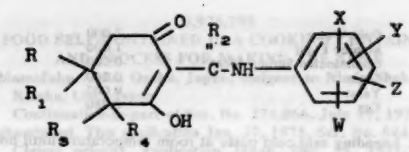
3,976,785

DIOXOCYCLOHEXANECARBOXANILIDE INSECTICIDES AND ACARICIDES

Robert Eugene Diehl, Trenton; Michael Stanley Schrider, South Bound Brook, and Sidney Kantor, Lawrenceville, all of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 412,088, Nov. 2, 1973, abandoned, which is a division of Ser. No. 197,967, Nov. 11, 1971, now Defensive Publication No. 3,801,630, which is a continuation-in-part of Ser. No. 106,933, Jan. 15, 1971, abandoned. This application May 15, 1975, Ser. No. 577,976
Int. Cl.² A01N 9/20, 9/12
U.S. Cl. 424—324 15 Claims

1. A method for the control of pests selected from the group consisting of insects and acarids as well as the eggs or larvae thereof, comprising contacting said insects, acarids, or eggs or larvae thereof with a pesticidally effective amount of a compound having the formula:



wherein R and R_1 are each selected from the group consisting of hydrogen, lower alkyl (C_1–C_4), phenyl, halophenyl and benzyl; R_2 is sulfur or oxygen; R_3 and R_4 are each selected from the group consisting of hydrogen, lower alkyl (C_1–C_4) and phenyl; W is hydrogen or halogen; X is hydrogen, halogen, lower alkyl (C_1–C_4), halo-substituted lower alkyl (C_1–C_4), lower alkoxy (C_1–C_4), lower alkylthio (C_1–C_4) or nitro; Y is hydrogen, halogen, lower alkyl (C_1–C_4) or halo-lower alkyl (C_1–C_4) and Z is hydrogen or halogen.

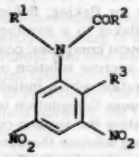
3,976,786

METHOD OF PREVENTING COCCIDIOSIS WITH 3,5-DINITROANILINE DERIVATIVES AND VETERINARY COMPOSITIONS CONTAINING SUCH DERIVATIVES

Brian William Sharp, Hornchurch; Dennis Warburton, Brentwood; Raymond Barry Williams, Upminster, and Kenneth Robert Harry Wooldridge, Brentwood, all of England, assignors to May & Baker Limited, England

Division of Ser. No. 453,643, March 21, 1974, Pat. No. 3,911,011. This application July 23, 1975, Ser. No. 598,534
Claims priority, application United Kingdom, Mar. 23, 1973, 14191/73
Int. Cl.² A61K *31/165*
U.S. Cl. 424—324 **15 Claims**

1. A method of preventing coccidiosis in chickens which comprises administering orally to said chickens a prophylactically-effective amount of at least one 3,5-dinitroaniline derivative of the formula:



wherein R^1 is hydrogen, methyl, ethyl, n-propyl, iso-propyl, n-butyl, iso-butyl or sec-butyl, R^2 is hydrogen, alkyl of 1 through 4 carbon atoms or cycloalkyl of 3 or 4 carbon atoms, and R^3 is hydrogen, methyl or ethyl.

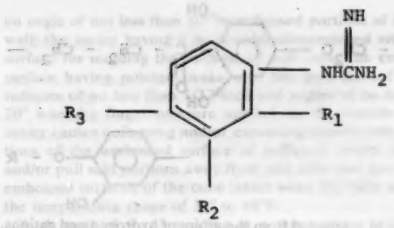
3,976,787

PHARMACEUTICAL GUANIDINE PREPARATIONS AND METHODS OF USING SAME

John Lawrence Hughes; Robert Chung-Huan Liu, both of Kankakee; Takashi Enkoji, and James Winslow Bastian, both of Park Forest, all of Ill., assignors to Armour Pharmaceutical Company, Phoenix, Ariz.

Continuation-in-part of Ser. No. 88,501, Nov. 10, 1970, abandoned. This application Mar. 6, 1975, Ser. No. 556,067
Int. Cl.² A61K *31/155*
U.S. Cl. 424—326 **12 Claims**

1. A pharmaceutical preparation for providing vasoconstrictive therapy comprising a pharmaceutically acceptable carrier and an effective amount of a phenylguanidine compound, or a non-toxic acid addition salt thereof, said compound having the formula:



wherein: R_1 is hydrogen and R_2 and R_3 are chloro; or R_1 and R_4 are hydrogen and R_2 is hydroxy; or R_1 is methyl and R_2 and R_3 are hydrogen.

3,976,788

ANTIPSYCHOTIC AGENTS

Bernard M. Regan, Chicago, Ill., assignor to Baxter Laboratories, Inc., Deerfield, Ill.

Division of Ser. No. 373,547, June 25, 1973, abandoned. This application Aug. 5, 1974, Ser. No. 494,584
Int. Cl.² A61K *31/08*
U.S. Cl. 424—342 **1 Claim**

1. The method of convulsive therapy comprising inducing a therapeutic convulsion in an animal by administering to said animal an effective amount for inducing a therapeutic convulsion of the compound $CHF_2—O—CH_2CF_2CHF_2$ in vapor form by inhalation while maintaining respiration of said animal.

3,976,789

COSMETIC COMPOSITION

Kenichi Tomita, Yokohama; Mitsuo Yanagi, Sagamihara, and Toshiaki Kobayashi, Yokohama, all of Japan, assignors to Shiseido Co., Ltd., Tokyo, Japan

Filed Feb. 1, 1974, Ser. No. 438,525
Int. Cl.² A61K *47/00*
U.S. Cl. 424—365 **4 Claims**

1. In a non-irritating, physically stable, non-biodegradable, chemically stable cosmetic composition having low oral and percutaneous toxicity, comprising a carboxylic acid ester, the improvement which comprises employing at least one saturated triester or tetraester formed by the esterification reaction between an alcohol selected from the group consisting of trimethylolethane, trimethylolpropane and pentaerythritol and a carboxylic acid having a side chain at the 2-position selected from the group consisting of 2-ethyl-hexanoic acid, 2-hexyl decanoid acid and 2-heptyl-undecanoid acid, said saturated triesters and tetraesters being employed in amounts from about 14% to 55% by weight of the composition, as the carboxylic acid ester.

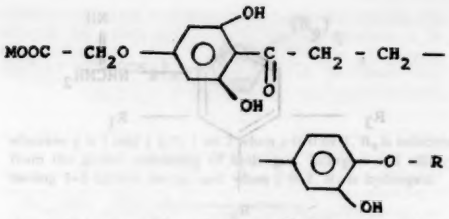
3,976,790

IONIC DIHYDROCHALCONE SWEETENERS AND FOOD PRODUCT CONTAINING THE SAME

Guy A. Crosby, and Grant E. DuBois, both of Palo Alto, Calif., assignors to Dynapol, Palo Alto, Calif.

Filed June 10, 1974, Ser. No. 477,744
Int. Cl.² A23G *3/30*
U.S. Cl. 426—3 **25 Claims**

1. A sweetened edible product comprising an edible material and in intimate admixture therewith, a compound of the structural formula



wherein M is selected from the group of hydrogen and cations, and R is a lower saturated alkyl of from 1 to 4 carbon atoms, in an amount of from 0.0001% to 0.5% by weight (basis material) effective to produce a desired sweetness sensation.

3,976,791

SOFT PRETZEL

Richard R. Seiberlich, 1120 E. Algonquin Road, Apt. 3J, Schaumburg, Ill. 60172

Continuation-in-part of Ser. No. 566,274, April 9, 1975, abandoned. This application Nov. 24, 1975, Ser. No. 634,374

Int. Cl.² A21D *2/00*

U.S. Cl. 426—19 **11 Claims**

1. A process for producing a pretzel which, after cooking, will remain soft for an extended period of time, said process consisting essentially of:

a. mixing from about 51 parts by weight water having a temperature of from about 60°F. to 90°F. with sufficient yeast to cause a mixture containing 100 parts by weight flour to rise, said mixing completely blending the yeast and water, and said mixing occurring for at least 1 minute;

b. mixing the yeast-water mixture with about 100 parts by weight wheat flour, with said wheat flour being mixed in an amount greater than about 100-lbs. by weight, said mixing occurring at least about 8 minutes;

c. forming the mixture into the shape of a pretzel or other food shape;

d. saturing the outside of the formed pretzel with a sodium hydroxide solution; and

e. cooling the sodium hydroxide coated pretzel until the temperature thereof is below −15°F. for at least 1 hour.

3,976,792

PROCESS FOR MAKING SHRIMP CHIPS AND RESULTANT PRODUCT

Le Minh Triet, 5805 Herbert St., Burke, Va. 22215

Filed Jan. 29, 1976, Ser. No. 653,577

Int. Cl.² A21D *2/00*

U.S. Cl. 426—52 **11 Claims**

1. A process for preparation of a shrimp containing foodstuff comprising the steps of:

A. preparing an emulsion comprising crushing a block of frozen shrimp and comminuting to form an emulsion;

B. preparing a cold paste comprising said emulsion and including the following components, by approximate unit weight relationship:

Cold Water	2.000
Manioc Flour	1.000
Comminuted Shrimp Meat	0.500
Sugar	0.200
Yeast	0.002
Egg	0.080

C. kneading said cold paste at room temperature until homogeneous, forming said paste into a stick and completely covering said stick by a thin water-impervious material;

D. steaming said covered sticks for approximately 40 minutes at a temperature of from 100°C to 130°C;

E. cooling said covered sticks at a temperature of approximately 0°C for approximately 24 hours;

F. unwrapping said covered sticks and cutting said sticks into slices;

G. drying said slices for at least 6 hours at a temperature up to 50°C to produce moisture content in each slice of approximately 8–12% by weight;

H. frying said dried slices for approximately from 10–20 seconds in heated oil, said heated oil being maintained at a temperature between 150°C and 180°C; and

I. flattening the hot slices and removing excess oil.

3,976,793

BREAKFAST CEREAL PROCESS AND PRODUCT

Robert D. Olson, Springfield, and Robert H. Eifler, Battle Creek, both of Mich., assignors to General Foods Corporation, White Plains, N.Y.

Continuation-in-part of Ser. No. 537,633, Dec. 30, 1974, abandoned. This application Feb. 25, 1975, Ser. No. 552,918

Int. Cl.² A23B *9/00*; A23L *1/10*

U.S. Cl. 426—96 **12 Claims**

1. An improved process of manufacturing a nutritious, sugar-coated ready-to-eat cereal flake which comprises forming a cooked cereal dough wherein the farinaceous ingredients consists essentially of oat and soy flours, the dough having a moisture content of 18% - 26%; pelletizing the cooked dough in a densified state and partially drying the pellets to a moisture content suitable for flaking; flaking the partially dried pellets; toasting the flakes to a moisture content below 5%; wherein the improvement comprises: coating a hot, dilute, and unsaturated aqueous sucrose solution onto the toasted flake surface at a concentration which initially facilitates penetration of the flake to cause the solution to impregnate the surface thereof; and heating the surface-coated flake to rapidly concentrate the coating solution thereon, cause crystallization of the coating solids, and redry the flakes to a moisture content of 2% – 4%.

3,976,794

ENCAPSULATION OF SUGAR AND ITS USE IN SWEETENED COCONUT

Lawrence A. Johnson, Medina, and Larry A. Walters, Parma, both of Ohio, assignors to SCM Corporation, New York, N.Y.

Filed June 3, 1974, Ser. No. 475,623

Int. Cl.² A23G *3/00*

U.S. Cl. 426—103 **8 Claims**

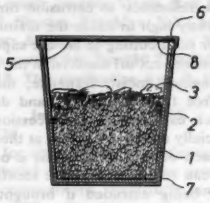
1. An improved sweetened coconut product comprising an edible coconut base particle which is coated with a mixture of powdered sugar particles and particles of sugar encapsulated in edible fat, the proportion of sugar in said encapsulated sugar particles constituting at least about 5% of the total sugar content of said coating mixture and the proportion of said encapsulated particles constituting not substantially in excess of that proportion which will impart a threshold textural difference to the product, the maximum particle size of the preponderance of said encapsulated sugar particles being restricted to about four times the maximum particle size of said powdered sugar particles.

3,976,795

FOOD SELF-CONTAINED IN A COOKING CONTAINER AND PROCESS FOR MAKING THE SAME

Momofuku Ando, Osaka, Japan, assignor to Nissin Shokuhin Kaisha, Ltd., Japan

Continuation-in-part of Ser. No. 274,066, July 19, 1972, abandoned. This application Jan. 27, 1975, Ser. No. 544,280
Claims priority, application Japan, Dec. 25, 1971, 47-1932[U]
Int. Cl.² B65D *3/06*, *65/00*; B65B *25/22*
U.S. Cl. 426—115 4 Claims



1. A containizered instant-food item comprising:
a. a foamed polystyrene container having a portion of sufficiently small diameter to permit easy gripping and holding by a single hand;
b. a dehydrated, instant-cooking food which is cooked by the action of hot water disposed in said container;
c. a laminated semi-rigid top cover having on its underside an aluminum foil film and having the same diameter as the outer diameter of said container, said top cover being substantially co-extensive with and in sealable, air-tight contact with the top of the container, said top cover including a projecting portion extending beyond the edge of said cover, said projecting portion permitting partial removal of said cover for the insertion of hot water to cook the food and restoration of the said cover to its original position during cooking by the action of the water; and
d. a substantially non-ventilating, heat-contracted film substantially completely enclosing in a substantially air-tight manner said container and said top cover, the portion of the heat-contracted film covering the top cover including a small opening to provide for the substantially complete removal of air from between the film and the container during heat-contraction.

3,976,796

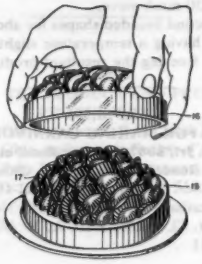
PACKAGE FOR DEMOLDING EMBOSSED BUTTER AND MARGARINE

Leo Peters, 750 Plymouth Road, SE., Grand Rapids, Mich. 49506

Filed June 30, 1975, Ser. No. 591,610
Int. Cl.² A23C *15/00*
U.S. Cl. 426—115 6 Claims

1. A package for demolding embossed butter or firm bodied margarine when the butter or margarine is within the temperature range of 38° to 48°F. comprising in combination a thermoformable plastic film-sheet within the thickness range of 0.005 to 0.20 inch having a single-walled, unlined cup-like cavity thermoformed therein and flow-filled butter or margarine filling the cavity, the butter or margarine being firmed to a solid cube by refrigeration; the film-sheet being shaped to provide the cavity with an opening through which said cavity is filled and emptied, a bottom wall oppposite the opening having an embossed but nevertheless level plane area sufficient to support said cavity in an opening-upright, self-supporting posture during filling and shipping; a side wall extending from the bottom wall to the opening and having an inward taper from the edge and plane of the opening of an angle of no less than 5° in non-embossed portions of the side wall, and an angle of not less than 10° in embossed portions of the side wall; the cavity having a multi-cubic-dimensioned embossed surface for molding the surfaces of said cube; the embossed surface having pointed peaks with the tops thereof having radiuses of no less than 1/32-inch and angles of no less than 20° whereby finger pressure applied on the outside of the cavity causes collapsing and/or expanding movements of portions of the embossed surface of sufficient extent to push and/or pull said portions away from said cube and demold the embossed surfaces of the cube intact when the cube is within the temperature range of 38° to 48°F.

6. A method for demolding at a temperature within the range of 38° to 48° F. multi-cubic-dimensioned designs molded on the top surfaces of cubes of butter or firm-bodied margarine comprising forming from a thermoplastic film-sheet having a thickness within the range of 0.005 to 0.020 inch a cup-like, single-walled, unlined cavity having multi-cubic-dimensioned embossing fold-oriented designs thermoformed on its inside surfaces, limiting said embossing surfaces to designs that will mold butter and margarine surfaces whose sharpest points and peaks are no sharper than 1/32 inch radius and whose inside acute angles are no less than 20°, flow-filling butter or margarine into said cavity whereby it is filled and cast into, and molded by, said embossing surfaces, refrigerating said flow-filled and cavity-cast embossed-surfaced butter or margarine to change it from a fluid phase to a solid phase for demolding at temperatures within the 38° to 48° F. range, thereafter demolding said refrigerated butter or margarine by turning said cup-like cavity open-side down, and pressing on the top outside of said cavity, thereby producing on said embossing surfaces collapsing and/or expanding movements which function with an action that pushes and pulls said embossing surfaces away from said embossed surfaces, thereby releasing said embossed surfaces from said embossing surfaces with said designs unbroken and intact.



3,976,797

LOW CORROSION AZO COLORANTS

Thomas E. Furia, San Jose, Calif., assignor to Dynapol, Palo Alto, Calif.

Filed Mar. 10, 1975, Ser. No. 556,601
Int. Cl.² A23L *1/275*
U.S. Cl. 426—131 14 Claims

1. The combination of a surface comprising a metal subject to corrosive chemical attack by nonpolymeric azo dyes in confining or retaining contact with a material containing a coloring amount of a polymeric azo dye.

3,976,798

METHOD FOR PRODUCING BREADED VEGETABLE SHAPES

Larry L. Young, Roselle; Herbert Horn, Country Club Hills, and Joseph G. Endres, Downers Grove, all of Ill., assignors to Central Soya Company, Inc., Fort Wayne, Ind.

Continuation of Ser. No. 402,119, Oct. 1, 1973, abandoned.
This application Apr. 7, 1975, Ser. No. 565,674
Int. Cl.² A23B 7/16; A23L 1/212
U.S. Cl. 426—291 2 Claims

1. In a process for producing breaded vegetable shapes, the steps of:

applying to the vegetable shapes a first batter at a temperature of about 40°–50°F. having a viscosity of about 375 centipoise,

applying a first breading to the batter coated shapes, a major proportion of said first breading passing through a 50 mesh sieve but being retained on a 100 mesh sieve,

applying a second batter at a temperature of about 40°–50°F. to the breaded shapes, said second batter having a viscosity of about 50 centipoise,

applying a second breading to the second batter coated shapes, a major proportion of said second breading being retained on a 30 mesh sieve,

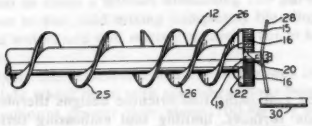
immersing the second breaded shapes for about 5–15 seconds in an oil bath having a temperature slightly under 400°F., and thereafter freezing the resultant product.

3,976,799

METHOD FOR MAKING CARNIVORE FOOD

William H. Kelly, Jr., 2047 Granger Road, and John R. Kelly, 1961 Granger Road, both of Medina, Ohio 44256

Continuation of Ser. No. 55,418, July 16, 1970, abandoned.
This application Feb. 18, 1975, Ser. No. 550,605
Int. Cl.² A23K 1/10; A23P 1/00
U.S. Cl. 426—311 4 Claims



1. The method of making a carnivore food comprising:

making a mixture consisting essentially of about equal parts of coarse ground, or chopped, fresh meat and dry precooked cereal particles to which is added supplements consisting essentially of vitamins and proteins, in an amount from 0% to about 10% of the total meat and cereal mixture;

confining the mixture and, while it is confined, advancing the mixture unidirectionally along a path as a compact mass, at a uniform rate and under relatively constant pressure, and substantially free from air pockets and cavities and free from appreciable squeeze back, doughiness and gumminess, to the entrances of extrusion passages by mechanical pressure effected by a means which is non-edible and applied to the mixture at locations which advance along said path with the material;

continuously forcing portions of the mixture, in succession, into and through said extrusion passages by maintaining said application of mechanical pressure up to a final location which is immediately adjacent the entrances of passages, so as to force the mixture, free from feedback, unidirectionally through the extrusion passages by said mechanical pressure directly applied to the mixture immediately adjacent the entrances of the passages;

maintaining the portion of the mixture in advance of, and up to, the entrances of said passages with the tissue strands of said coarse ground, or chopped, meat free from cutting of the individual strands during said advance of the mixture up to said entrances, and intermittently, at regular intervals in timed relation to the advance, cutting off said advancing mixture, immediately adjacent said entrances, from the mixture in said passages; while said non-edible means is effecting mechanical pressure immediately adjacent said entrances;

immediately after each cutting operation, causing successive portions of the advancing mixture to be forced into said passages in like manner to the preceding portions, and to be engaged with the trailing ends of the mixture in the passages, with sufficient pressure to force the mixture in said passages to pass therethrough;

maintaining the resistance to extrusion through said passages sufficiently high to cause the mxiture entering the passages after each cutting to adhere superficially to the trailing ends of the cut-off material in the passages and to produce elongated moist, frangible, individually firm extrusions, free from gumminess and doughiness, and each of which extrusions is a succession of individual slugs superficially adhered together at their ends, respectively, and each of which extrusions is of a consistency such that it can retain its separate identity from others concurrently being extruded if brought into contact therewith;

controlling the moisture consistency of the extrusions by controlling the feed composition;

maintaining the rate of feed, extrusion, and cutting such that the material is not appreciably heated, and such that the meat fluids can penetrate into the cereal, and such that the individual tissues fo the coarse ground or chopped meat originally introduced are generally free from more than a single cutting during the advance and extrusion thereof.

3,976,800

PROCESS FOR THE MANUFACTUE OF BISCUITS

Rolf Deininger, and Erich Wolf, both of Cologne, Germany, assignors to Klosterfrau Berlin GmbH, Germany

Continuation-in-part of Ser. No. 400,807, Sept. 26, 1973, abandoned. This application Oct. 21, 1975, Ser. No. 624,575
Claims priority, application Luxemburg, July 12, 1973, 68000
Int. Cl.² A23L 1/30; A23J 1/14, 1/20
U.S. Cl. 426—311 9 Claims

1. A process for making a chewable and edible low carbohydrate, high protein and low fat bar, which process consists of:

a. melting one part by weight of an edible fat having a melting point in the range of 28° to 40° C together with 0.03 to 0.2 parts by weight of lecithin or a vegetable phosphatide to form a dispersing agent;

b. kneading into the dispersing agent 1.5 to 4 parts by weight of a food powder containing at least 60% by weight protein based on solids and containing 5 to 35% by weight carbohydrates based on solids, said protein substantially retaining its natural structure, said kneading being performed at a temperature of 28° to 50° C thereby rendering the resultant mixture thixotropic;

c. shaping said thixotropic mixture while flowable and

d. permitting the shaped flowable mixture to stand and cool, thereby solidifying.

2. A process for making a chewable and edible low carbohydrate, high protein and low-fat bar, which process consists of:

a. melting one part by weight of an edible fat having a melting point in the range of 28° to 40° C together with 0.03 to 0.2 parts by weight of lecithin or a vegetable phosphatide to form a dispersing agent;

b. kneading into the dispersing agent 1.5 to 4 parts by weight of a food powder containing at least 60% by weight protein based on solids and containing 5 to 35% by weight carbohydrates based on solids, said protein substantially retaining its natural structure, and 0.1 to 1 part by weight of additives selected from the group consisting of sorbitol, mannitol, xylitol, mineral salts, flavorings and vitamins or mixtures

thereof to form a homogeneous flowable mixture, said kneading being performed at a temperature of 28° to 50° C thereby rendering the resultant mixture thixotropic;
c. shaping said thixotropic mixture while flowable and
d. permitting the shaped flowable mixture to stand and cool thereby solidifying.

3,976,801

FLAVORING COMPOSITIONS CONTAINING ALKYL ESTERS OF 2-METHYL-4-PENTENOIC ACID

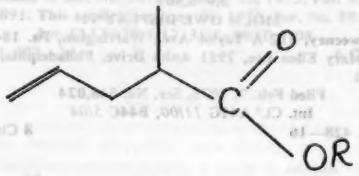
John B. Hall, Rumson; Ching Y. Tseng, Middletown; Manfred Hugo Vock, Locust; Joaquin Vinals, Red Bank, all of N.J., and Edward J. Shuster, Brooklyn, N.Y., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Continuation-in-part of Ser. No. 490,718, July 22, 1972, Pat. No. 3,907,718. This application Apr. 8, 1975, Ser. No. 566,117

Int. Cl.² A23L *1/235*

U.S. Cl. 426—534 5 Claims

1. A process for altering the organoleptic properties of a consumable material selected from the group consisting of food flavoring compositions, foodstuffs, and chewing gum which comprises adding thereto a small but effective amount of a composition comprising an unsaturated ester having the structure:



wherein R is one of C_3–C_6 alkyl in order to enhance or impart a fruit flavor in said consumable material.

3,976,802

FLAVORING AGENT

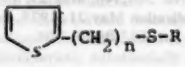
Max Winter, Geneva; Fritz Gautschi, Commugny; Ivon Flament; Max Stoll, both of Geneva, all of Switzerland, and Irving M. Goldman, Niantic, Conn., assignors to Firmenich & Cie, Geneva, Switzerland

Division of Ser. No. 482,820, July 24, 1974, which is a division of Ser. No. 243,866, April 13, 1972, abandoned, which is a division of Ser. No. 70,560, Sept. 8, 1970, Pat. No. 3,702,253, which is a continuation of Ser. No. 543,069, April 18, 1966, abandoned, which is a continuation-in-part of Ser. No. 452,342, April 30, 1965, abandoned. This application June 4, 1975, Ser. No. 583,807

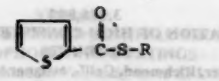
Int. Cl.² A23L *1/234*

U.S. Cl. 426—535 48 Claims

1. As a new composition of matter a soluble coffee material having added thereto a minor, but flavor modifying amount of a compound selected from the group of compounds having the general formulae:



wherein R is hydrogen, methyl, acetyl or thenyl and *n* is 1 or 2; and



wherein R is methyl, ethyl or furfuryl.

3,976,803

FOAMED FORMED CONFECTIONS

Jan Herman Koppijn, 29, Single, B-2230, Schilde, Antwerp, Belgium

Continuation-in-part of Ser. No. 439,946, Feb. 5, 1974, abandoned. This application Nov. 5, 1975, Ser. No. 629,474

Claims priority, application Belgium, Apr. 3, 1973, 258323

Int. Cl.² A23G *3/00*

U.S. Cl. 426—572 6 Claims

1. A foamed formed confection comprising (a) about 50% by weight of a mixture comprising from 3 to 97 weight % of an enzymatic glucose syrup and from 97 to 3 weight % of an maltose syrup and (b) about 50% by weight of dextrose or a mixture of dextrose and saccharose.

3,976,804

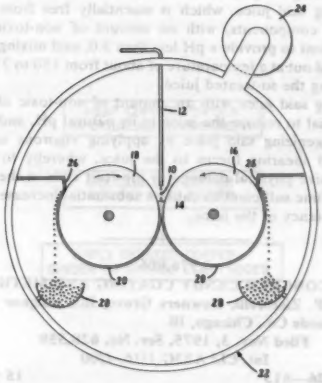
POWDERED TEA PRODUCT AND PROCESS FOR PRODUCTION

Rupert J. Gasser, Old Greenwich, Conn., and James G. Franklin, Marysville, Ohio, assignors to Societe d'Assistance Technique pour Produits Nestle S.A., Lausanne, Switzerland

Filed Oct. 21, 1974, Ser. No. 516,354

Int. Cl.² A23F *3/00*

U.S. Cl. 426—597 13 Claims

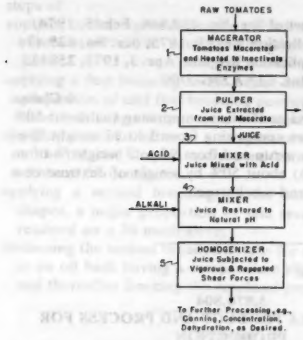


1. A process for dehydrating an aqueous extract of tea leaves having a concentration of from 400to 55% by weight of solids comprising applying a film of said extract in a thickness of between 0.035 and 0.065 centimeters on the external surface of a rotating drum, maintaining the internal temperature of said drum in a range of from 95° to 125°C, evaporating water from said film under a condition of vacuum of from 3 to 15 Tor. for a residence time of from 10 to 150 seconds until the total moisture content of the extract is in the range between 2 to 4%, and then subjecting the dried film to a shearing force to remove the dried extract from the surface of said drum as flakes having an apparent density of less than 12 grams per 100 cc.

3,976,805
PREPARATION OF HIGH-CONSISTENCY TOMATO PRODUCTS

Robert Becker, Richmond, Calif., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Continuation of Ser. No. 142,951, May 13, 1971, abandoned. This application Nov. 26, 1974, Ser. No. 527,323
Int. Cl.² A23L *1/28*
U.S. Cl. 426—599 **4 Claims**



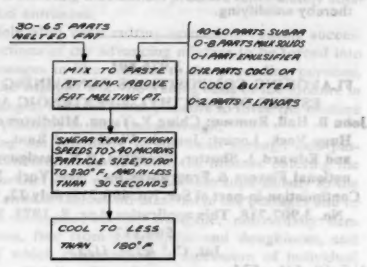
1. A process for preparing tomato juice of increased consistency, which consists of
   a. heating raw tomatoes, at their natural pH, at a temperature and for a time sufficient to inactivate the enzymes, but insufficient to damage the tomatoes, said heating being carried out concomitantly with maceration of the raw tomatoes,
   b. extracting the juice from the tomato material,
   c. mixing said juice, which is essentially free from gross solids components, with an amount of non-toxic acid sufficient to provide a pH less than 3.0, said mixing being carried out at a temperature of about from 150 to 212° F.,
   d. cooling the so-treated juice,
   e. mixing said juice with an amount of non-toxic alkaline material to restore the juice to its natural pH, and
   f. homogenizing said juice by applying vigorous and repeated shearing forces to the juice, whereby to cause extensive physical damage to the fruit cells in the juice, for a time sufficient to cause a substantial increase in the consistency of the juice.

3,976,806
FAST CONCHED CANDY COATING AND METHOD

Salvatore F. Ziccarelli, Downers Grove, Ill., assignor to Beatrice Foods Co., Chicago, Ill.

Filed Nov. 3, 1975, Ser. No. 628,559
Int. Cl.² A23G *1/16, 1/00*
U.S. Cl. 426—613 **15 Claims**

1. A process for producing a candy coating comprising:
   1. heating 30 to 65 parts fat to temperatures above the melting point thereof;
   2. mixing with the melted fat the ingredients of
      a. 40 to 65 parts sugar,
      b. 0 to 8 parts milk and/or whey solids,
      c. 0 to 1 part emulsifier,
      d. 0 to 12 parts cocoa or cocoa butter, and
      e. 0 to 2 parts flavors;
   3. maintaining the temperature of the heated mixture above the melting point of the fat and below 150°F;
   4. conching the heated mixture by high speed shearing and mixing, wherein the solid particles of the mixture are sheared by shearing forces having the average shear component at 75° or greater to produce sheared particles having at least one dimension of 40 microns or less and the mixing being sufficient to mechanically raise the conching temperature of the heated mixture to 190°F to 320°F in a conching time of less than 30 seconds and to

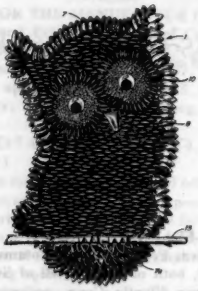

30-65 PARTS MELTED FAT
40-60 PARTS SUGAR
0-8 PARTS MILK SOLIDS
0-1 PART EMULSIFIER
0-12 PARTS COCO OR COCO BUTTER
0-2 PARTS FLAVORS
MIX TO PASTE AT TEMP. ABOVE FAT MELTING PT.
SHEAR & MIX AT HIGH SPEEDS TO >90 MICRONS PARTICLE SIZE, TO 190° TO 320° F, AND IN LESS THAN 30 SECONDS
COOL TO LESS THAN 180° F

   reduce the moisture content of the conched mixture to 1% or less; and
   5. lowering the temperature of the conched mixture to less than 180°F.

3,976,807
MOCK OWL DISPLAY

Doris Sweeney, 512 A Taylor Ave., Warrington, Pa. 18476, and Mary Ellen Lee, 7951 Anita Drive, Philadelphia, Pa. 19111

Filed Feb. 7, 1975, Ser. No. 548,024
Int. Cl.² A41G *11/00*; B44C *5/04*
U.S. Cl. 428—16 **8 Claims**



1. A mock-owl display consisting essentially of:
   1. a flat support which circumscribes the figure of an owl and to which is adfixed,
   2. sunflower seeds and rice in a patterned arrangement to simulate feathers; and including
   3. a twig for a perch,
   4. two simulated eyes, and
   5. cutouts to represent an owl's beak and talons.

3,976,808
IMAGING SYSTEMS

Satoru Honjo; Yasuo Tamai, and Nobuo Tsuji, all of Tokyo, Japan, assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 364,848, May 29, 1973, Pat. No. 3,926,825. This application May 21, 1975, Ser. No. 579,339
Int. Cl.² B05D *1/06*
U.S. Cl. 427—17 **10 Claims**

1. A method of developing a recording surface bearing an electrostatic latent image comprising contacting said recording surface with a liquid developer composition consisting

essentially of finely-divided colored marking particles substantially homogenously dispersed in a carrier liquid, said colored marking particles being substantially completely covered with a positive charge adjusting agent which is substantially insoluble in said carrier liquid, said charge adjusting agent consisting essentially of a solid terpolymer of (1) from about 5 to about 94.5% by weight of a polymerizable styrene composition, (2) from about 94.5 to about 5% by weight of a composition selected from the group consisting of polymerizable acrylate and methacrylate esters, and (3) from about 0.5 to about 50% by weight of a polymerizable organo silicone composition selected from the group consisting of organo silanes, silanols, and siloxanes having from 1 to 3 hydrolyzable groups and an organic group attached directly to a silicone atom containing an unsaturated carbon-to-carbon linkage, said terpolymer having a weight average molecular weight of at least about 5,000, until at least a portion of said finely-divided colored marking particles deposit on said recording surface in conformance to said electrostatic latent image.

3,976,809

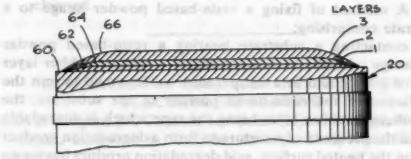
COATING FOR METAL SURFACES AND METHOD FOR APPLICATION

Robert D. Dowell, 23321 Falena Ave., Torrance, Calif. 90501

Division of Ser. No. 387,717, Aug. 13, 1973, Pat. No. 3,911,891. This application June 30, 1975, Ser. No. 591,537

Int. Cl.² F02F *3/12, 3/02;* **B05D** *1/08*

U.S. Cl. 427—34 **6 Claims**



1. A method of depositing a thermal barrier coating on a metal surface comprising the following steps:

depositing on said metal surface, a first layer constituting an alloy comprised of approximately 95% nickel and 5% aluminum;

depositing on said first layer, a second layer constituting a blend of approximately 65% of a zirconium oxide mixture and 35% of said first layer alloy; and

depositing on said second layer, a third layer constituting primarily zirconium oxide.

4. A method of fabricating a piston for use in an internal combustion chamber including the steps of:

depositing on the piston end face within an area spaced inwardly from the circumferential edge of said end face, a first layer constituting an alloy exhibiting a thermal expansion characteristic substantially the same as that exhibited by said piston material;

depositing a second layer on said first layer; and

depositing a third layer on said second layer having a thermal barrier characteristic substantially greater than that of said piston material and wherein said second layer has a thermal expansion characteristic between that of said first and third layers.

3,976,810

PROCESS FOR ANION REMOVAL FROM ORTHOPHOSPHATE COATINGS

James Lee Hecht, Richmond, Va., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 26, 1975, Ser. No. 553,426

Int. Cl.² C01B *25/36;* **B32B** *27/06;* **B05D** *3/00*

U.S. Cl. 427—40 **14 Claims**

1. In a process for coating an organic polymeric shaped article on at least one surface with a cured aluminum orthophosphate coating having a topcoating thereover which comprises applying said orthophosphate from a dispersion containing an anion compound as the source of aluminum, drying said coating, depositing thereover a topcoating of an organic solvent solution of a polymer, and drying said topcoating, the improvement which consists in (1) drying said aluminum orthophosphate coating under temperature conditions to effect no more than a partial cure thereof, and (2) thereafter reducing the concentration of anion in said coating below about 1% of the weight of the solids content of said coating, dry basis, prior to completing the cure of said aluminum orthophosphate.

13. The process as defined in claim **3** wherein said step of reducing the concentration of anion is carried out by diffusion into an adjacently placed anion acceptor layer.

3,976,811

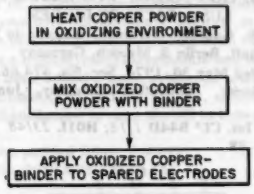
VOLTAGE RESPONSIVE SWITCHES AND METHODS OF MAKING

Arthur N. DeTommasi, Newtonville, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Mar. 3, 1975, Ser. No. 554,724

Int. Cl.² B05D *7/00, 5/12*

U.S. Cl. 427—58 **6 Claims**


HEAT COPPER POWDER IN OXIDIZING ENVIRONMENT
MIX OXIDIZED COPPER POWDER WITH BINDER
APPLY OXIDIZED COPPER-BINDER TO SPARED ELECTRODES

1. A method of making an irreversible voltage sensitive switch characterized by a first high resistance state of greater than approximately a megohm and a second low resistance state of less than approximately 100 ohms, said method comprising the steps of:

heating at approximately 70°C. to 130°C. substantially pure grade copper powder of approximately 99.99% purity for a sufficient time to oxidize the outer surface of said copper powder, said copper powder having a particle size of between approximately 1 and 30 microns;

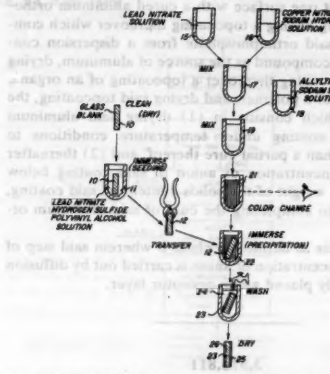
mixing the oxidized copper powder with an organic binder in ratios of approximately one part binder to two to five parts oxidized copper powder; and

applying said oxidized copper-binder mixture to a pair of spaced electrodes.

3,976,812
PHOTOCONDUCTIVE CELLS

Peter E. Natale, and Frank C. Bennett, Jr., both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed July 14, 1955, Ser. No. 521,987
Int. Cl.² G03C 1/74
U.S. Cl. 427—74 5 Claims

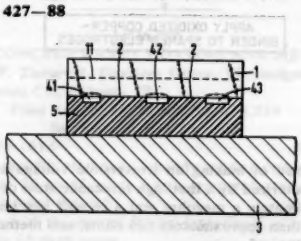


1. A method of forming a photosensitive layer of lead sulfide crystals which comprises precipitating the crystals onto a seeded glass support by adding a solution of allyl-thiourea to an alkaline solution of a copper nitrate and a lead nitrate having a concentration of copper between 5×10^{-5} and 5×10^{-4} molar, a concentration of lead between 0.05 and 0.06 molar, and a concentration of hydroxide between 0.55 and 0.75 molar and immersing said seeded glass support in the resulting mixture.

3,976,813
METHOD OF PRODUCING, METAL CONTACTS WITH LOW ABSORPTION LOSSES ON GALLIUM PHOSPHIDE LUMINESCENCE DIODES

Claus Weyrich, Gauting, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed May 30, 1974, Ser. No. 474,663
Claims priority, application Germany, June 6, 1973, 2328905
Int. Cl.² B44D 1/18; H01L 23/48
U.S. Cl. 427—88 4 Claims



1. A method of producing a low resistance electrical contact, on a semiconductor body of a luminescent diode and which is also suitable for securing such semiconductor body to an electrically conductive body which acts as a heat sink, comprising the steps of alloying at a temperature of approximately 500°C, a plurality of metal contacts, disposed in spaced relation, on the surface of the semiconductor body which is to be contacted, with such metal contacts each having an area which is small with respect to such surface of the semiconductor body, and the contacts, as a whole, having a total area of between 5% and 20% of the corresponding surface area of the semiconductor body, and thereafter securing the surface of the semiconductor body provided with such metal contacts to a metallic heat sink by an electrically and thermally conductive adhesive layer.

2. A method according to claim 1, wherein the adhesive layer comprises a solder which has a low melting point and whose alloying temperature is above a lower limit temperature at which the solder forms an alloy with the metal contacts and the metal of the heat sink, and is below an upper limit temperature at which the semiconductor body does alloy with the solder.

3,976,814
FUSING METHOD

Richard J. Murphy, Norwood, Mass., assignor to Xerox Corporation, Stamford, Conn.

Filed Aug. 14, 1974, Ser. No. 497,410
Int. Cl.² B05D 3/10, 1/06
U.S. Cl. 427—226 15 Claims

1. A method of fixing a resin-based powder image to a substrate comprising:

a. contacting a substrate bearing a resin-based powder image with the heated surface of a silicone rubber layer for a time and at a temperature sufficient to permit the fusion of the resin-based powder to the substrate, the silicone rubber layer being the type which is degradable in the presence of moisture to form a degradation product on the heated surface, said degradation product having an adhesion for the fused resin-based powder which is less than the adhesion which the fused resin-based powder has for the substrate;

b. applying moisture on the heated surface of the moisture-degradable silicone rubber in an amount sufficient to form the degradation product on the heated surface;

c. separating the substrate from the heated surface whereby the fused resin-based powder is retained on the substrate; and

d. permitting the fused resin-based powder on the substrate to cool.

3,976,815
METHOD FOR CLEANING AND COATING ROD

Oliver R. Brekle, Pell City, Ala., assignor to M & B Metal Products Company, Leeds, Ala.

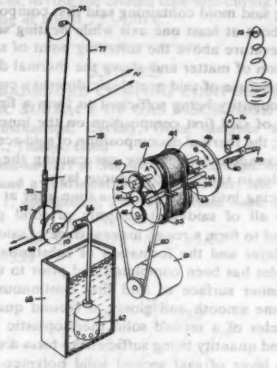
Continuation of Ser. No. 315,201, Dec. 14, 1975, Pat. No. 3,886,894. This application Apr. 30, 1975, Ser. No. 573,356
Int. Cl.² B21C 43/04
U.S. Cl. 427—292 4 Claims

1. A method for preparing rod for drawing, the rod having brittle scale and other impurities on its outer surface comprising the steps of

continuously feeding a supply of rod from a rod source, through a cleaning unit,

scraping the exterior surface of the rod in the cleaning unit by the frictional engagement of the rod passing between the two abrasively coated resilient drum members disposed substantially opposite each other, each of said

drum members rotating about its own axis, each of said drum members positively compressed against said rod when said members rotate, and also orbiting about an



axis, substantially corresponding to the mid point of the rod, whereby the entire outer surface of the rod is cleaned.

3,976,816

ACTIVATION OF SURFACES INTENDED FOR ELECTROLESS PLATING

Earl J. Fadgen, Jr., Clinton, and Juan Hajdu, Orange, both of Conn., assignors to Enthone, Incorporated, West Haven, Conn.

Division of Ser. No. 410,645, Oct. 29, 1973, Pat. No. 3,871,889. This application Jan. 8, 1975, Ser. No. 539,553

Int. Cl.[2] C23C *3/02*

U.S. Cl. 427—304 **21 Claims**

1. A process for the electroless metal plating of a surface which comprises contacting an object surface intended to be electrolessly metal plated with a substantially colloidal metal particle-free acid liquid solution of a soluble lower alkanol-modified noble metal-tin chloride complex until the surface is rendered catalytic, the noble metal of the complex being a noble metal catalytic to the chemical reduction deposition of the metal desired to be plated on said surface, and electrolessly plating the metal on the thus-obtained catalytic surface by contacting the catalytic surface with a chemical reduction metal plating bath, the soluble lower alkanol-modified noble metal-tin chloride complex being obtained by mixing together a lower alkanol, a soluble noble metal chloride, stannous chloride, and hydrochloric acid, and maintaining the thus-obtained liquid mixture at a reaction temperature of at least about 160°F. but below that at which an excessive amount of noble metal is precipitated for a period sufficient to obtain a catalytically effective solution containing the soluble lower alkanol-modified noble metal-tin chloride complex, the stannous chloride being present in excess of the amount thereof required to reduce the noble metal chloride to zero valent noble metal, the molar ratio of stannous chloride to the noble metal chloride (calculated as palladium chloride) being initially at least about 9–10:1 respectively, and the lower alkanol being present in amount sufficient to obtain a soluble complex.

3,976,817

METHOD OF PREPARING DIFFUSION TRANSFER IMAGE-RECEIVING MATERIALS

Yoshito Mukaida, and Masayoshi Tsuboi, both of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Aug. 22, 1972, Ser. No. 282,807

Claims priority, application Japan, Aug. 25, 1971, 46-64992

Int. Cl.[2] B05D *3/10*; **G03C** *1/76*

U.S. Cl. 427—308 **10 Claims**

1. A method of preparing a diffusion transfer image-receiving material for use in a silver halide diffusion transfer process which consists of contacting the surface portion of an alkali non-diffusible sheet composed of a polymer selected from cellulose diacetate, cellulose triacetate, a cellulose butyrate, or a mixture of cellulose esters, with a solution or a dispersion of diffusion transfer nuclei in an organic solvent consisting of alcohols, ketones, ethylene glycol, ethers, or a solvent mixture of said solvents and water, which is capable of swelling the alkali non-diffusible polymer layer to absorb said nuclei in said surface portion, and then contacting said surface portion containing said diffusion transfer nuclei with a solvent containing an alkai or an acid to render said surface portion alkali diffusible.

3,976,818

POLYFLUORINATED AMINE OIL-REPELLENT, STAIN-RELEASE FABRIC TREATMENT

William J. Connick, Jr., and Samuel E. Ellzey, Jr., both of New Orleans, La., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed July 18, 1972, Ser. No. 272,813

Int. Cl.[2] C09K *3/18*

U.S. Cl. 427—381 **4 Claims**

1. A process for imparting oil repellency and anti-stain properties to a textile fabric, which process comprises:

a. padding the textile fabric with a treating composition consisting of an aqueous emulsion containing about 1-5 wt. % of a product prepared by mixing equimolar amounts of 1,1-dihydroperfluorooctylamine and tetrakis (hydroxymethyl) phosphonium chloride in water in the presence of an emulsifier consisting of an octylphenoxyethanol or a trimethylnonyloxyethanol- and to which emulsion has been added a basic substance selected from the group consisting of sodium acetate, sodium hydroxide, and triethanolamine to raise the pH to between about 4.8 and 7.1

b. drying the padded fabric from (a) .

c. curing the dried fabric from (b).

3,976,819

RESIN-COATED GLASS BOTTLES

Atsuo Mori, Takatsuki; Kozo Tsuji, Ibaragi, and Shuji Kitamura, Toyonaka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka and Hayashibara Biochemical Laboratories, Incorporated, both of, Japan

Filed Feb. 25, 1975, Ser. No. 552,875

Claims priority, application Japan, Feb. 27, 1974, 49-24620

Int. Cl.[2] B32B *27/38*, *17/06*, *17/10*

U.S. Cl. 428—35 **3 Claims**

1. A resin-coated glass bottle which comprises a pullulan resin coating layer on the exterior surface of a bottle, and an alkali resistant resin coating layer on said pullulan resin coating layer, wherein the thickness of the pullulan resin coating layer is 100 to 1,000μ, wherein the thickness of the alkali-resistant resin coating layer is 10 to 500μ and wherein the molecular weight of the pullulan resin is 50,000 to 3,500,000.

3,976,820

PROCESS FOR THE PRODUCTION OF PILE SURFACED ARTICLES

Anton Alfred Arthur Giovanelli, Oestringen, and Eckhard Wolfgang Schmidt, Bad Schonborn, both of Germany, assignors to Imperial Chemical Industries Limited, London, England

Filed Jan. 31, 1975, Ser. No. 546,146

Claims priority, application United Kingdom, Feb. 4, 1974, 5021/74

Int. Cl.² B29C *17/02*

U.S. Cl. 428—85 12 Claims

1. A process for the production of pile surfaced synthetic materials comprising feeding a synthetic polymeric thermoplastic material and a backing web to a surface heated with the thermoplastic synthetic polymeric material between the backing web and the surface under conditions where the polymeric material is filament forming and the polymeric material adheres to the surface and bonds to the backing web, then withdrawing the backing web from that surface so that as the backing web is so withdrawn the synthetic polymeric material adheres thereto and is drawn into fibrils due to its adhesion to the surface but the fibrils remain integral with the remainder of the polymeric material which is laminated to the backing web, rendering the polymeric material non-filament forming by cooling, separating the fibrils from the surface and subsequently separating the pilous synthetic polymeric layer from the backing web.

3,976,821

ROTATIONALLY MOLDING A MULTILAYERED ARTICLE

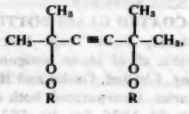
Guy E. Carrow, and Robert L. Rees, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed May 14, 1973, Ser. No. 359,724

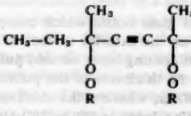
Int. Cl.² B29C *5/04;* B29D *9/00;* B29F *5/00;* B29G *7/00*

U.S. Cl. 428—474 15 Claims

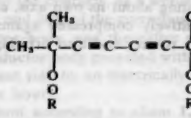
1. A method for rotationally molding a hollow multilayered article which comprises introducing into a rotational mold a first quantity of solid particles of a first composition of matter comprising a first solid thermoplastic polymer selected from the group consisting of ethylene homopolymers, copolymers of ethylene and at least one acyclic mono-1-olefin hydrocarbon having 3 to 8 carbon atoms per molecule, and mixtures thereof, said first solid polymer having a melt index of at least about 10 having incorporated therein a crosslinking amount of an acetylenic diperoxy compound selected from the group consisting of hexynes having the formula



octynes having the formula



and octadiynes having the formula



wherein R is selected from the group consisting of tertiary alkyl, alkyoxycarbonyl, and benzoyl;

rotating said mold containing said first composition of matter about at least one axis while heating said mold to a temperature above the softening point of said first composition of matter and above the thermal decomposition temperature of said acetylenic diperoxy compound, said first quantity being sufficient to form a first continuous layer of said first composition on the inner wall of said mold; the thermal decomposition of said acetylenic diperoxy compound liberating gas causing the formation of bubbles in said first continuous layer;

introducing into said mold, at a time after at least substantially all of said first quantity of solid particles have melted to form a rough inner surface of said first continuous layer and the formation of substantially all of said bubbles has been completed and prior to the time when the inner surface of said first continuous layer would become smooth and glossy, a second quantity of solid particles of a second solid thermoplastic polymer, said second quantity being sufficient to form a second continuous layer of said second solid polymer on the inside surface of said first continuous layer;

rotating said mold containing said first composition of matter and said second quantity of solid particles about at least one axis while heating said mold to a temperature above the melting point of said second solid thermoplastic polymer to form and melt said second continuous layer;

cooling said mold containing the thus molded article to a temperature at which said first and second continuous layers are solidified; thereby forming a laminated article having good adhesion between said first continuous layer and said second continuous layer, said second continuous layer being at least substantially free of said bubbles; and

removing the thus solidified article from said mold.

3,976,822

MAGNETIC TAPE AND PROCESS OF MAKING A MAGNETIC TAPE

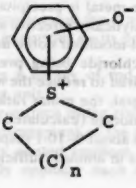
Mary R. Thomas; Robert H. Lalk; Syamalarao Evani, and Donald L. Schmidt, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 479,958, June 17, 1974, Pat. No. 3,901,816. This application May 23, 1975, Ser. No. 580,500

Int. Cl.² H01F *10/02*

U.S. Cl. 428—500 7 Claims

1. The process of making a magnetic tape comprising coating a base tape with an aqueous dispersion of magnetic particles having dissolved therein monomer cyclic sulfonium zwitterions comprising one or more functional group represented by the formula



wherein *n* is 2–3 and the carbon atom valences are satisfied with H, alkyl or other inert substituents and, in the case of polyfunctional zwitterions, two or more functional groups are linked together through bridging groups attached to the aromatic rings, the monomeric cyclic sulfonium zwitterions being present in an amount sufficient, when polymerized, to constitute a binder for the magnetic particles and together with the particles, to constitute a firmly adherent, flexible magnetic coating for said tape, magnetically orienting the magnetic particles therein, drying the coated tape and curing the coated tape by heating at about 75°–150°C.

3,976,823

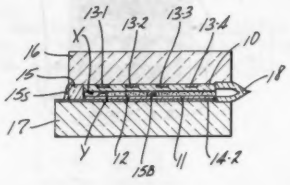
STRESS-BALANCED COATING COMPOSITE FOR DIELECTRIC SURFACE OF GAS DISCHARGE DEVICE

Roger E. Ernsthausen, Luckey, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Continuation-in-part of Ser. No. 70,523, Sept. 8, 1970, abandoned, and a continuation-in-part of Ser. No. 163,066, July 15, 1971, abandoned. This application Sept. 21, 1973, Ser. No. 399,747

Int. Cl.² H01J *61/30, 65/04*

U.S. Cl. 428—539 **12 Claims**



1. As an article of manufacture, a dielectric material body for gaseous discharge panel, said body having thereon a first layer of at least one compound of Group IIA, Al, Si, Ti, Zr, Hf, or mixtures thereof; a second layer of at least one compound of Group IIA, Al, Si, Ti, Zr, Hf, or mixtures thereof which is chemically different from the first layer; and a third layer of an electron-emissive material; the combination of the first and second layers being sufficient to prevent ion migration from the dielectric to the third layer and sufficient to provide a thermally and structurally stable base for the third layer; and the second layer being chemically inert relative to the third layer.

3,976,824

TREATING AGENT USEFUL FOR FIBROUS MATERIALS AND PREPARATION THEREOF

Junji Ariyoshi, Hirakata; Akira Ohnishi, Ashiya; Hiromi Toda, Daito; Kametaro Kunimori, Neyagawa, and Mitsuyoshi Nakao, Kawachinagano, all of Japan, assignors to Arakawa Rinsan Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed June 3, 1975, Ser. No. 583,262

Claims priority, application Japan, June 5, 1974, 49-64444

Int. Cl.² C08F *8/30, 8/08;* **D06M** *15/12*

U.S. Cl. 526—23 **20 Claims**

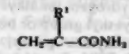
1. A treating agent useful for fibrous materials which comprises

A. a reaction product of (a) an amide-containing cationic copolymer having a viscosity of 10 to 2,000,000 cP at 25°C. in 10 % by weight aqueous solution thereof and (b) a polyalkyleneimine having a degree of polymerization of not less than 20, or

B. a reaction product of the above ingredients (a) and (b) and (c) a halohydrin selected from the group consisting of epichlorohydrin, epibromohydrin, monochlorohydrin, monobromohydrin, dichlorohydrin and dibromohydrin;

said amide-containing cationic copolymer being prepared by copolymerizing a monomer mixture consisting of

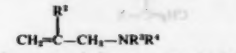
i. 30 to 97 % by mole of at least one monomer having the following formula:



(1)

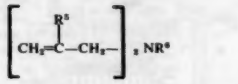
wherein R^1 is hydrogen or methyl group,

ii. 3 to 70 % by mole of at least one cationic monomer selected from the group consisting of monomers having the following formulae or their salts:



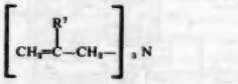
(2)

wherein R^2 is hydrogen or methyl group, and R^3 and R^4 are independently hydrogen, an alkyl group having 1 to 6 carbon atoms, 2-hydroxyethyl group or benzyl group;



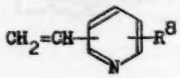
(3)

wherein R^5 is hydrogen or methyl group, and R^6 is hydrogen, an alkyl group having 1 to 6 carbon atoms, 2-hydroxyethyl group or benzyl group;

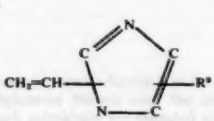


(5)

wherein R^7 is hydrogen or methyl group;

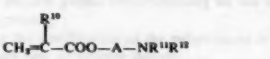


wherein R^8 is hydrogen or an alkyl group having 1 to 4 carbon atoms;



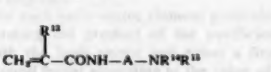
(6)

wherein R^9 is hydrogen or an alkyl group having 1 to 4 carbon atoms;



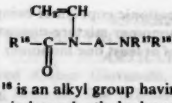
(7)

wherein R^{10} is hydrogen or methyl group, R^{11} and R^{12} are independently hydrogen, an alkyl group having 1 to 6 carbon atoms, 2-hydroxyethyl group or benzyl group, and A is ethylene group, trimethylene group, tetramethylene group or 2-hydroxytrimethylene group;



(8)

wherein R^{13} is hydrogen or methyl group, R^{14} and R^{15} are independently hydrogen, an alkyl group having 1 to 6 carbon atoms, 2-hydroxyethyl group or benzyl group, and A is ethylene group, trimethylene group, tetramethylene group or 2-hydroxytrimethylene group;



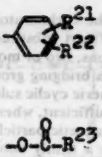
(9)

wherein R^{16} is an alkyl group having 1 to 4 carbon atoms, R^{17} and R^{18} are independently hydrogen, an alkyl group having 1 to 6 carbon atoms, 2-hydroxyethyl group or benzyl group, and A is ethylene group, trimethylene group, tetramethylene group or 2-hydroxytrimethylene group, and

iii. 0 to 40 % by mole of a monomer having the following formula:

(10)

wherein R^{19} is hydrogen or methyl group and X is a member selected from the group consisting of —$COOR^{20}$, —CN,



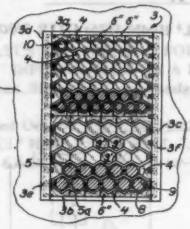
and -$CONHR^{24}$ and wherein, R^{20} is hydrogen, an alkyl group having 1 to 8 carbon atoms, glycidyl group or a hydroxyalkyl group having 2 to 4 carbon atoms, R^{21}, R^{22} and R^{23} are independently hydrogen, methyl group or ethyl group and R^{24} is a hydroxyalkyl group having 1 to 2 carbon atoms or

ELECTRICAL

3,976,825
LEAD-THROUGH FOR ELECTRIC CABLES AND THE LIKE

Hans Erik Anderberg, Rasundsvaren 72, 171 37 Solna, Sweden

Continuation of Ser. No. 432,090, Jan. 9, 1974, abandoned.
This application June 24, 1975, Ser. No. 589,668
Claims priority, application Sweden, Jan. 15, 1973, 7300523
Int. Cl.[2] H02G 3/22; F16L 5/02
U.S. Cl. 174—151 14 Claims



1. A lead-through, for conducting electrical cables and the like through an opening in a wall or ceiling said lead-through being fire-proof, gas-proof, and liquidproof at a predetermined temperature, comprising:

a frame structure for bounding an opening in a wall or ceiling;

inwardly extending flanges on two opposing sides of the frame structure narrowing the opening of said frame structure;

a plurality of guide means within said frame structure forming a plurality of spaces for cables to be passed through said opening, said guide means individually encircling each of one or more cables when said cables extend through said frame structure, said guide means being composed of a material having a relatively high coefficient of cubic expansion, whereby in the event of fire, said guide means will expand and form tight seals around the cables and against each other to prevent transfer of flame and combustion gases through said lead-through;

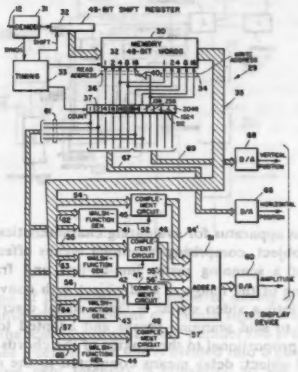
a plurality of filling members extending between the sides of said frame structure and said guide means, said filling members being composed of a material having a relatively high coefficient of cubic expansion, whereby, in the event of fire, said filling members will expand and form tight seals against said guide means, against said frame structure and against each other to prevent transfer of flame and combustion gases through said lead-through; and

retaining means for retaining said guide means and said filling members within the confines of said frame structure, said retaining means arranged to abut and rest upon said flanges of said frame structure adjacent a first outer end of said opening, said guide means and said filling members abutting said retaining means.

3,976,826
METHOD AND APPARATUS FOR GENERATING LINE-BY-LINE PICTURE SIGNAL FROM TRANSFORMED SUBPICTURE INFORMATION

James McFerrin Fulton, Jr., Chapel Hill, N.C., assignor to Western Electric Company, Inc., New York, N.Y.

Filed May 7, 1975, Ser. No. 575,288
Int. Cl.[2] H04N 7/12
U.S. Cl. 178—6 12 Claims



2. In a display system wherein a picture is divided into rows having subpictures therein and the amplitudes of picture points in each subpicture are encoded as at least one coefficient of a Hadamard transform, each coefficient being associated with a particular basis vector in a Hadamard matrix, a method of automatically generating amplitudes for at least one line of picture points encompassing all the subpictures in a row, comprising:

A. storing the coefficients of the subpictures in the row; and

B. for each line of picture points;

a. selecting the elements of each basis vector that relate to the picture points in that line;

b. for each subpicture in the row:

i. retrieving the stored coefficients;

ii. generating the elements of the basis vectors selected in step (a);

iii. for each basis-vector element generated in step (ii), forming the product of the coefficient associated with the basis vector and either a first factor or a second factor according to the value of the element; and

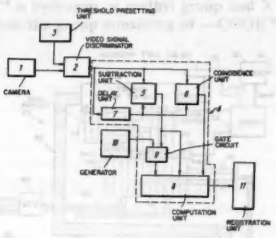
iv. for each picture point, adding the products formed in step (iii) for the basis-vector elements relating to the picture point to form the amplitude of the picture point.

3,976,827

APPARATUS FOR EVALUATING CHARACTERISTICS OF THE IMAGES OF OBJECTS

Imant Karlovich Allen, ulitsa Raunas, 45, kv. 32; Ivan Ivanovich Avdeev, ulitsa Malines, 70, kv. 41; Yakov Aronovich Gelfandbein, ulitsa Baltezera, 5, kv. 38; Boris Nikolaevich Ershov, ulitsa Sarkandaugava, 26, kv. 183; Anatoly Vasilievich Nikonenko, ulitsa Lokomativas, 98, kv. 16; Jury Olegovich Popov, ulitsa Veidenbaumma, 24, kv. 3; Arkady Yakovlevich Khesin, ulitsa Suvorova, 16, kv. 18, and Boris Albertovich Yanson, ulitsa B. Altonovas, 8, kv.1, all of Riga, U.S.S.R.

Filed Aug. 2, 1974, Ser. No. 494,276
Int. Cl.² H04N 7/02
U.S. Cl. 178—6 **23 Claims**



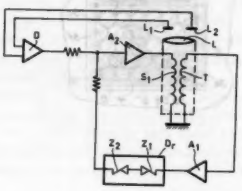
1. An apparatus for evaluating characteristics of the image of an object, comprising: scanning means effecting with the help of a scanning raster line-by-line and frame-by-frame scanning of the image of said object with conversion of said image into a video signal; a video signal discriminator connected to said scanning means and adapted to form square pulses proportional to the lengths of the chords of said image of said object; delay means connected to the output of said video signal discriminator, wherein said square pulses coming from said video signal discriminator are delayed for a time necessary for effecting synchronous comparison of said square pulses related to a current and delayed lines of said raster; a synchronous coincidence unit having a first input, a second input and an output, said first input being connected to the output of said video signal discriminator directly and said second input being connected to said output of said video signal discriminator through said delay means, for effecting comparison by the number of coincidences of the fronts of said square pulses related to said current and delayed lines; a synchronous subtraction unit having a first input, a second input and an output, said first input being connected to said output of said video signal discriminator directly and said second input being connected to the same said output through said delay means, for effecting subtraction of the duration of said square pulses proportional to the lengths of said chords of said image of the object in said current and delayed lines; a gate means having a first input, a second input and an output, said first input being connected to said output of said synchronous subtraction unit; a generator of quantizing pulses having its output connected to said second input of said gate means so that the square pulses of which the duration is proportional to the difference between the lengths of the chords in said current and delayed lines of said image of said object, obtained as a result of said subtraction, are filled with quantizing pulses coming from the output of said generator of quantizing pulses to said second input of said gate means; a unit for computation of the perimeter of said image of said object, having a first input, a second input and a third input and a third input and having said first input thereof connected to said output of said gate means, said second input thereof being connected to said output of said synchronous subtraction unit and said third input thereof being connected to said output of said synchronous coincidence unit so that within said perimeter computation unit a sequence of the quantized square pulses proportional to the difference between the lengths of the chords of said image in said current and delayed lines is used for approximation of a part of the perimeter of said image of said object, the value thus obtained having added thereto a quantity of interline spaces of said raster equal to the number of the coincidences of the fronts of said square pulses proportional to the lengths of the chords of said image, detected by said synchronous coincidence unit, in which manner said perimeter computation unit effects approximation of the full perimeter of said image of said object.

3,976,828

ARRANGEMENT FOR ALIGNING THE IMAGE OF AN INFORMATION STRUCTURE ON A CONVERTER

Peter Johannes Michiel Janssen, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 28, 1975, Ser. No. 544,854
Claims priority, application Netherlands, Feb. 9, 1974, 7401805
Int. Cl.² H04N 5/76; G11B 7/00
U.S. Cl. 178—6.6 R **5 Claims**



1. An arrangement for focussing an image of an information structure which is disposed on or in a substantially flat record carrier on a transducer by means of an optical element, comprising a light-sensitive detector, a light source aligned with the optical element for projecting light on the record carrier, means comprising said optical element for projecting light from the record carrier onto said light-sensitive detector, a control system which controls the optical element connected to said light-sensitive detector for controlling the focussing motion of said optical element, and a velocity detector connected to a non-linear velocity correcting means for supplying an electrical signal which is a measure of the velocity of movement of the optical element, said velocity correcting means being operative for detected velocities in excess of a predetermined velocity range, the output of the velocity correcting means being connected to a second input of a control system as a velocity feedback signal whereby detected velocities in excess of said predetermined velocity range are corrected.

3,976,829

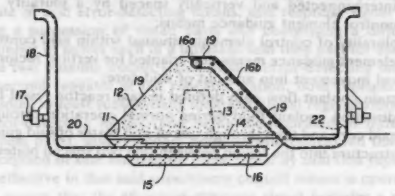
COLLECTOR APPARATUS FOR GASEOUS REACTION PRODUCTS

Günter Wiebke, Munich; Andreas Korsten, Balkhausen; Theodor Benecke, and Fritz Petersen, both of Grefrath, all of Germany, assignors to Elektroschmelzwerk Kempten GmbH, Munich, Germany

Filed Dec. 11, 1974, Ser. No. 531,621
Claims priority, application Germany, Dec. 21, 1973, 2364109; May 6, 1974, 2421818
Int. Cl.² H05B 3/60
U.S. Cl. 13—23 **16 Claims**

1. A collector apparatus for withdrawing gaseous reaction products from a reacting burden in an electric resistance furnace installation operated by direct electric heating, com-

prising a bed filled with porous material beneath the burden, a gas outlet duct communicating with said bed, and means for



withdrawing collected gaseous reaction products from the furnace installation through said duct.

3,976,830

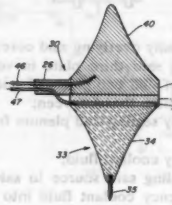
APPARATUS AND METHOD FOR EMBOSSING INFORMATION ON A DISC

William E. Glenn, Stamford, Conn., assignor to CBS Inc., New York, N.Y.

Filed Oct. 24, 1974, Ser. No. 517,529

Int. Cl.² H04R *17/06;* **H01L** *23/14, 41/08*

U.S. Cl. 178—6.6 B **6 Claims**



1. In an apparatus for receiving broadband electronic signals at frequencies in the megahertz region of the spectrum and embossing modulated grooves on a carrier medium as a function of the received signals, said apparatus including means for supporting an embossing assembly and said carrier medium in spaced relationship and means for causing relative motion as between said carrier medium and said embossing assembly; an embossing assembly comprising:

a wafer of piezoelectric material affixed to said supporting means;

means for applying said electronic signals across said wafer;

a tapered stylus member having a relatively blunt end coupled to one side of said wafer and tapering exponentially to a relatively pointy stylus end, said stylus end being positionable in contact with said medium, said tapered member serving to match the mechanical impedance as between said wafer and said carrier.

2. A method of embossing modulated grooves on a carrier medium with a stylus tip as a function of received electronic signals at frequencies in the megahertz region of the spectrum, comprising the steps of:

mounting a piezoelectric wafer in spaced relation with said carrier medium;

driving the piezoelectric wafer with said electronic signals to establish a compressional wave;

transforming the compressional wave to a state of higher velocity at lower force by coupling said wafer to an exponentially tapered horn; and

applying the transformed wave to said stylus tip.

3,976,831

METHOD FOR TRANSMITTING PICTURES AT A PICTURE TELEPHONE TRANSMISSION HAVING LIMITED BANDWIDTH

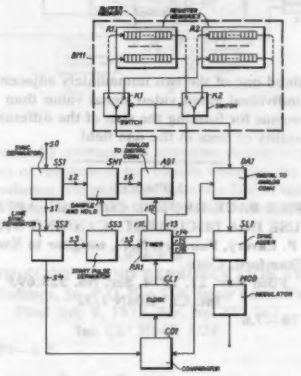
Curt Danell, Huddinge; Bo Gunnar Holmer, Hagersten, and Peder Magnus Rodhe, Saltsjobaden, all of Sweden, assignors to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Filed Dec. 6, 1974, Ser. No. 530,091

Claims priority, application Sweden, Dec. 20, 1973, 7317209

Int. Cl.² H04N *7/12*

U.S. Cl. 178—6.8 **2 Claims**



1. A method of transmitting still pictures during a picture telephone transmission by means of picture signals which are produced by the scanning of successive parallel and preferably horizontal lines wherein each line is divided into a number of elements whose light intensity is converted to the picture signals, comprising the steps of:

dividing the scanned picture into a pre-determined number of line groups each containing a predetermined number of said parallel lines.

scanning each line group a given number of times and during each scanning of the lines sampling an element and then not sampling a plurality of following elements before sampling another element of the line, displacing the elements to be sampled for each new scanning of the line group in such a manner that after said given number of scans of a line group all the elements of the line group are sampled,

storing a representation of the light intensity of each of the sampled elements in a line group, and

serially transmitting over a telephone transmission line signals related to the stored information with at most such a timing which corresponds to the bandwidth of the telephone transmission line.

3,976,832

CIRCUIT FOR DETECTING VERTICAL MIS-REGISTRATION IN A FLYING SPOT SCANNER

John David Millward, Hitchin, England, assignor to The Rank Organisation, Limited, London, England

Filed July 30, 1975, Ser. No. 600,426

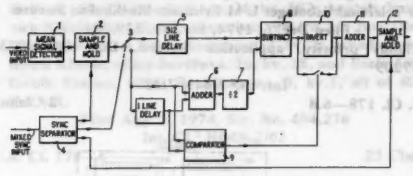
Claims priority, application United Kingdom, July 31, 1974, 22694/74

Int. Cl.² H04N *3/36*

U.S. Cl. 178—6.8 **6 Claims**

1. A circuit for providing an error signal indicative of vertical mis-registration in a flying spot scanner in which each film frame is scanned by at least two interlaced fields, the circuit comprising first means for forming in respect of each of a plurality of lines in one field, a signal representative of the

difference between the mean video signal value of each said line and the mean video signal value of the respective two immediately adjacent lines in the other field, second means for selectively reversing the sign of each difference signal when a



predetermined one of the two immediately adjacent lines has a greater individual mean video signal value than the other, and third means for forming the sum of the difference signals for the plurality of lines in the one field.

3,976,833

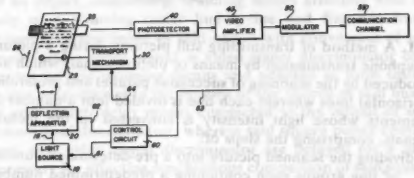
AMPLIFIER BACK-GROUND CONTROL APPARATUS FOR USE IN A DOCUMENT SCANNING SYSTEM

Lawrence P. Lavery, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Nov. 21, 1974, Ser. No. 525,693

Int. Cl.² H04N 1/32

U.S. Cl. 178—7.6 **6 Claims**



1. In a document scanning system including means for repetitively sweeping a beam of light along a line-like scanning station from a first end to a second end, means for advancing a document past said scanning station in a direction transverse to the direction of the sweep of said beam, and photosensitive means positioned at said scanning station to collect light reflected from said advancing document and provide an electrical signal proportional to the amount of said reflected light, the improvement comprising

platen back means at said scanning station to provide a backing for supporting said advancing document, said platen back means including a white density portion and a gray density portion, said gray density portion extending a predetermined distance from the first end and toward the second end of said scanning station, whereby misregistration of said document at said first end exposes a surface having a mid-range reflectance to said beam.

3,976,834

EMERGENCY CORE COOLING INJECTION MANIFOLD

Frank Bevilacqua, Windsor, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Mar. 25, 1974, Ser. No. 454,054

The portion of the term of this patent subsequent to Nov. 19, 1991, has been disclaimed.

Int. Cl.² G21C 9/00

U.S. Cl. 176—38 **16 Claims**

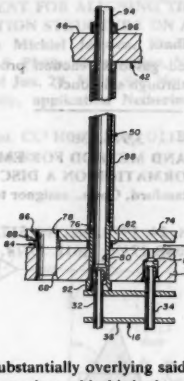
1. A nuclear reactor system comprising:

a reactor vessel having a nuclear core therein comprised of a plurality of fuel assemblies;

a guide structure supported in said vessel in vertically spaced relationship from said core, said guide structure including two vertically spaced plates each of which substantially overlies said core, said two plates being interconnected and vertically spaced by a plurality of control element guidance means;

a plurality of control elements situated within said control element guidance means and adapted for vertical reciprocal movement into and out of said core;

a main coolant flow path defined in said reactor vessel for directing coolant fluid during normal operation through said core and then through one of said plates of said guide structure into the region between said two spaced plates;



a third plate substantially overlying said core;

means for supporting said third plate in vertical spaced relation from one of said two plates of said guide structure to define a plenum therebetween;

means for substantially sealing said plenum from said main coolant flow path;

a source of emergency coolant fluid;

means for flow coupling said source to said plenum for introducing emergency coolant fluid into said plenum; and

means connected to said plenum for discharging emergency coolant therein into said core of said nuclear reactor.

3,976,835

SUPERVISORY SYSTEMS FOR TELECOMMUNICATION LINE TRANSMISSION SYSTEM

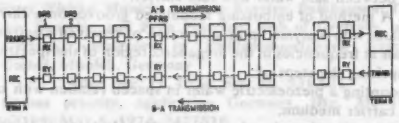
Douglas Stanley Larner, Twickenham; Velauthar Kopalapillai Thillainayagam, Maidenhead; Ronald William Blackmore, Maidenhead, and Barry Michael Ernest Hill, Maidenhead, all of England, assignors to Plessey Handel und Investments A.G., Zug, Switzerland

Filed Dec. 18, 1974, Ser. No. 534,133

Claims priority, application United Kingdom, Dec. 18, 1973, 58463/73

Int. Cl.² H04B 3/46; H04L 25/20

U.S. Cl. 178—70 R **5 Claims**



1. A repeater station comprising a first repeater for a digital data-transmission system using a disparity-displaying digital code, said first repeater including a digital regenerator which has an error-detecting means connected thereto to continuously monitor the output thereof, supervisory control means

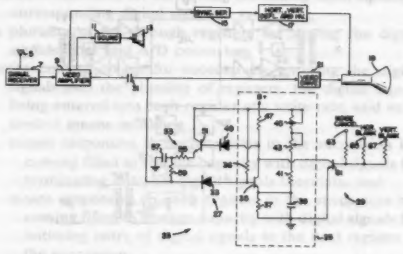
also incorporated in the repeater operative upon reception of an interrogate pulse signal, over one access path also used as a digital data-transmission path, to cause a response signal to be returned over said access path according to the prevailing state of said error-detecting means, said response signal having a succession of timed parts and comprising a different number of pulses each in a different said time part for each of the two possible output states of said error-detecting means, a second repeater at the repeater station, both repeaters including at least substantially identical digital regenerators and error-detecting means, and being incorporated in different access paths, said repeaters being so interconnected that the reception of said interrogate pulse signal by said first repeater is effective in that said supervisory control means is operative to ensure that the aforesaid response signal includes a pulse within the first of said timed parts and is also indicative of the prevailing state of the error-detecting means monitoring the digital regenerator of the second repeater.

3,976,836

AUTOMATIC BLACK LEVEL SETTING CIRCUIT

Robert Charles Wheeler, Elba, N.Y., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed June 9, 1975, Ser. No. 585,396
Int. Cl.² H04N 5/16
U.S. Cl. 178—7.3 DC **20 Claims**



14. An automatic black level setting circuit for a television receiver having a source of video signals including horizontal and vertical blanking interval signals and video information signals, an adjustable source of DC potential, and a source of circuit disabling signals corresponding to noise cancellation and said blanking interval signals comprising:

comparator circuit means coupled to said adjustable source of DC potential for establishing a potential threshold level, to said source of video signals for providing a control signal in response to video signals in excess of said threshold level, and to said source of circuit disabling potentials for disablement of said comparator circuit during portions of said video signal; and

detector and limiter means coupled to said comparator circuit means and to said source of video signals, said detector and limiter means responding to said control signal from said comparator circuit to effect establishment of a black level setting at said video signal source representative of video information signals and signals occurring during said vertical blanking interval in excess of said threshold level.

3,976,837

360° VIEWING SYSTEM

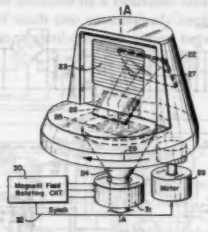
Paul Wentworth Lang, P.O. Box 1000, Orange, Calif. 92666

Filed Mar. 19, 1975, Ser. No. 559,798
Int. Cl.² H04M 9/54, 1/00
U.S. Cl. 178—791 **6 Claims**

1. A method of presenting a television picture to an audience in which the picture is centrally located and the audience surrounds the picture over 360°, comprising the steps of:

a. providing a support defining a flat surface in a vertical plane upon which said picture is displayed;

b. rotating said support about a vertical axis which bisects said picture in said vertical plane, at a given number of revolutions per minute; and



c. electronically rotating said television picture at said given number of revolutions per minute whereby any viewer in said audience will periodically have a line of sight normal to said plane and thereby will be able to view said picture.

3,976,838

HIGH FIDELITY SOUND REPRODUCTION SYSTEM

Robert J. Stallings, Jr., P.O. Box 230, Sugar Land, Tex. 77478

Filed July 9, 1973, Ser. No. 377,762
Int. Cl.² H04R 1/28
U.S. Cl. 179—1 E **6 Claims**

1. In a sound reproduction system, an enclosure-baffle assembly having an outwardly convex baffle surface and a multiplicity of inwardly disposed closed cavities intersecting said baffle surface in openings, of approximately the same size, and a like multiplicity of intermediate size loudspeakers disposed in said cavities with their diaphragms in said openings, one loudspeaker per cavity, each said loudspeaker being secured to the enclosure-baffle assembly to fill said opening and with the back face of its diaphragm operating into said cavity, said loudspeakers being electrically linked together for simultaneous reproduction of a common input signal.

3,976,839

TELEPHONE PRIVACY SYSTEM

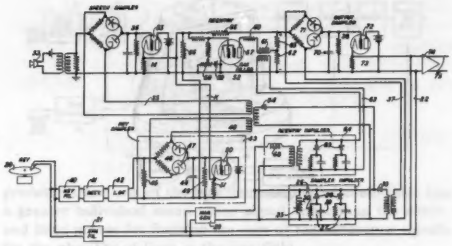
Ralph L. Miller, Chatham, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 30, 1944, Ser. No. 542,974
Int. Cl.² H04L 9/02
U.S. Cl. 179—1.5 M **16 Claims**

1. In combination, means for receiving a signal wave accompanied by a pilot impulse, means to combine with the received signal wave a locally produced wave in predetermined phase relation comprising means to produce a local pilot impulse in definite relation to said locally produced wave, signal storage means, means responsive to said first pilot impulse to enable said storage means to receive and store said signal wave, a

signal responsive device, and means controlled by said local impulse to impress said stored signal wave upon said signal responsive device together with said locally produced wave.

8. In a speech transmission system, means to sample input speech waves twice per cycle of the highest component frequency of the speech to be sent, means to produce pulses representative of the sampled speech equal in length to the time between sampling instants, means to combine said pulses with individual key pulses to disguise the speech pulses and means to transmit the combined pulses.



3,976,840

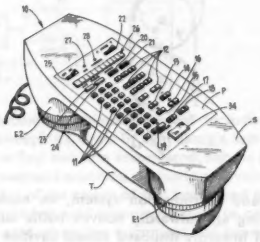
PORTABLE SECURITIES SELECTOR SYSTEM

Spencer Cleveland, San Francisco, and Fred F. Coury, Sunnyvale, both of Calif., assignors to Spencer Cleveland, San Francisco, Calif.

Filed July 14, 1975, Ser. No. 595,461

Int. Cl.² H04M 11/00

U.S. Cl. 179—2 DP **13 Claims**



1. A portable pocketsized securities selector unit for enabling bidirectional communication relating to securities pricing information and desired transactions with a central computer via conventional telephone lines, said securities selector unit comprising:

a housing;

a keyboard having a plurality of alpha character keys, digit keys and functions keys;

processing means responsive to the actuation of said keys for generating information signals corresponding thereto;

first means for converting said information signals to signals conformable with said telephone lines;

second means responsive to incoming signals from said telephone lines for converting said incoming signals to electrical signals; and

means for displaying said information signals and said electrical signals.

10. A portable handheld securities selector unit for use with an information transmission system in which securities pricing information may be elicited and securities transactions may be effected via a telephone, said unit comprising:

a housing having first and second laterally spaced, elongated generally cylindrical coupler portions joined by an integral web portion having an obverse surface facing generally away from said coupler portions and a reverse surface facing generally toward said coupler portions, said first and second coupler portions having a configuration adapted to receive respectively the transmitter and receiver portions of a telephone handset;

a keyboard mounted on said obverse surface of said web portion of said housing and having a plurality of alpha character keys, digit keys and function keys; and

display means mounted on said obverse surface adjacent said keyboard for enabling display of said securities pricing information and information relating to said securities transactions.

3,976,841

ELECTRONIC TIME SWITCHING TELEPHONE SYSTEM

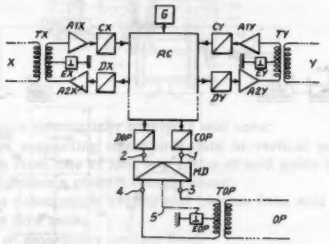
Jean Picandet, Paris, Seine, France, assignor to Jeumont-Schneider, Puteaux, France

Filed Jan. 21, 1975, Ser. No. 542,860

Claims priority, application France, Jan. 25, 1974, 74.02478

Int. Cl.² H04M 3/20

U.S. Cl. 179—15 AT **10 Claims**



1. An electronic time switching telephone system having a connection network for interconnecting the lines of a plurality of correspondents and at least one operator line and controlled by a central logic control unit, each correspondent line and said operator line having transmission channel and a reception channel, said system comprising:

a transformer connecting each correspondent line and said operator line to said connection network, each transformer having a primary winding and a secondary winding, said secondary winding forming part of said transmission and reception channels,

a balancing network connected to the secondary winding for isolating said transmission and reception channels, and

a modem unit connected between the secondary winding of the operator's transformer and the connection network, said modem unit having a transmission path and a reception path forming part of the operator's transmission channel and reception channel respectively, said reception path of said modem comprising a demodulator, a capacitor connected to said demodulator and charged thereby, a variable gain amplifier connected to said capacitor, said variable gain amplifier connected to provide signals to the operator's secondary winding, and said transmission path of said modem comprising an amplifier connected to receive signals from the operator's secondary winding, said amplifier connected to a capacitor and said capacitor connected to a modulator,

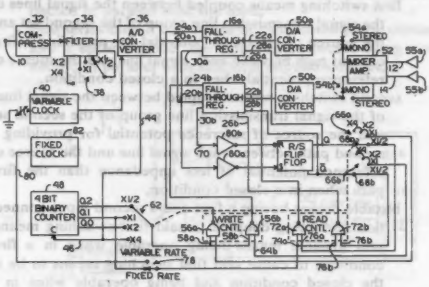
said modem unit further comprising means for at least partially cancelling the action of the operator balancing network.

3,976,842

ANALOG RATE CHANGER

Clifton A. Hoyt, Barnes, Wis., assignor to Hayward Research, Inc., Hayward, Wis.

Filed Mar. 10, 1975, Ser. No. 556,628
Int. Cl.² H04B 1/66
U.S. Cl. 179—15.55 T 25 Claims



1. An analog rate changer comprising:

an input for receiving analog signals bearing information of which the frequencies thereof are a part;

an A/D converter for converting the analog input signals to corresponding digital signals;

a plurality of fall-through registers for storing the digital signals from said A/D converter;

write control means for successively entering the digital signals into the plurality of registers, the digital signals being entered into each register at a write rate, said write control means including

means responsive to each register in the succession becoming filled to storage capacity with digital signals for terminating entry of digital signals thereinto, and

means responsive to each register in the succession becoming filled to storage capacity with digital signals for initiating entry of digital signals to the next register in the succession;

read control means for continuously removing from all of the plurality of fall-through registers the digital signals stored therein, the stored digital signals being removed from said registers at a read rate less than said write rate; and

means for converting the digital signals from the plurality of registers to corresponding analog output signals, said analog output signals bearing information substantially duplicative of that carried by the corresponding analog input signals and having frequencies proportionately less than the analog input signals corresponding thereto.

3,976,843

MFC RECEIVER DIGITAL SIGNAL PROCESSING

Robert Bertold Buchner, and Jan Philippus Maat, both of Hilversum, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

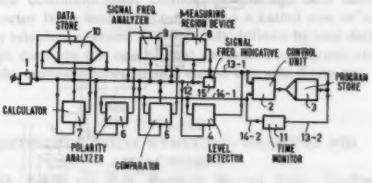
Filed Dec. 4, 1974, Ser. No. 529,289
Claims priority, application Netherlands, Dec. 12, 1973, 7316990
Int. Cl.² H04Q 1/00
U.S. Cl. 179—15 BY 18 Claims

1. A multi-frequency code receiver for determining at least two tone signals of a group of multi-frequency tone signals received in sampled form, comprising a combination of

a. an electronic digital computer which is programmed such that the tone signal frequencies are determined by detection of the sum signal frequency and the beat signal frequency,

b. a signal frequency indicator which is connected to the computer and which serves to record signals which are applied thereto by the computer and which are representative of the tone signal frequencies, and

c. a switching device having connected thereto the computer in order to apply samples represented in digital form to the computer, characterized in that the computer is further programmed such that, upon reception of samples applied in digital form, the computer selects the sample having the highest amplitude received thus far, calculates the location of a fictitious zero crossing of the sum signal of each two successively received samples of different sign, calculates the times between successive



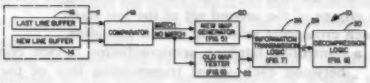
zero crossings on the basis thereof, selects the longest time calculated thus far from the times calculated during a given measuring time, selects the times which are situated in the maxima of the beat signal, calculates a selected quotient of the longest time determined thus far and one of the selected times, and determines the sum signal frequency on the basis of the selected times in dependence of the fact whether or not the calculated quotient satisfies a predetermined first value.

3,976,844

DATA COMMUNICATION SYSTEM FOR TRANSMITTING DATA IN COMPRESSED FORM

Bernard K. Betz, Edina, Minn., assignor to Honeywell Information Systems, Inc., Waltham, Mass.

Filed Apr. 4, 1975, Ser. No. 565,308
Int. Cl.² G06F 7/20
U.S. Cl. 179—15.55 R 17 Claims



1. Data communications apparatus comprising:

A. first buffer means for providing a first plurality of data representative of the present data to be compressed;

B. second buffer means for providing a second plurality of data representative of data previously compressed;

C. means for comparing the individual data in said first buffer means with the individual data in said second buffer means;

D. means, responsive to the comparison made by said means for comparing, for generating a new map indicating, in the order of comparison, the number of repeat data and the number of non-repeat data detected between said first and second pluralities of data; and

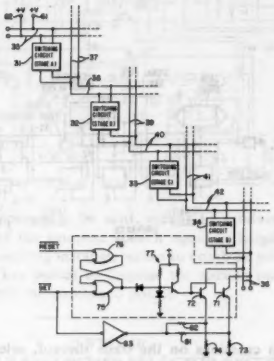
E. means, responsive to said means for generating, for transmitting only those individual data of said first plurality of data which are detected to be non-repeat data as indicated by said new map.

3,976,845

SWITCHING NETWORK HAVING IMPROVED TURN-ON CAPABILITY

Albert H. Ashley, Holliston, Mass., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed Dec. 8, 1975, Ser. No. 638,512
Int. Cl.² H04Q 3/50
U.S. Cl. 179—18 GF 7 Claims



1. A switching system comprising

a number of stages of crosspoint switching matrices arranged in order, each stage including

a plurality of crosspoint switching circuits,

a first set of signal transmission line groups, each group having at least one signal line and a control line, and

a second set of signal transmission line groups, each group having at least one signal line and a control line;

each signal transmission line group of the first set of each stage being associated with each signal transmission line group of the second set of the same stage at different ones of the crosspoint switching circuits of the same stage;

each signal transmission line group of the second set of each stage except the last in order being coupled to a different one of the signal transmission line groups of the first set of the next stage in order;

whereby the switching system provides a multiplicity of possible signal transmission paths between signal transmission line groups of the first set of the first stage and signal transmission line groups of the second set of the last stage;

each crosspoint switching circuit including

a controlled latching semiconductor device connected between each signal transmission line of the signal transmission line group of the first set and a signal transmission line of the signal transmission line group of the second set associated with the crosspoint switching circuit, and

triggering means connected to the controlled latching semiconductor devices of the crosspoint switching circuit and to the control lines of the signal transmission line groups of the first and second sets associated with the crosspoint switching circuit,

the application of coincident pulses to the control lines of the signal transmission line groups of the first and second sets associated with the crosspoint switching circuit causing current flow from the triggering means to the controlled latching semiconductor devices thereby switching the controlled latching semiconductor devices, when biased for conduction, to conduction and establishing signal transmission paths between the first and second sets of signal transmission line groups associated with the crosspoint switching circuit;

energizing potential means connected to the signal lines of the first set of signal transmission line groups of the first stage;

a plurality of biasing current control means, each connected to the signal lines of a signal transmission line group of the second set of the last stage;

each biasing current control means including

a source of reference potential,

first switching means coupled between the signal lines of the signal transmission line group of the second set and the source of reference potential for providing a first current path between each signal line and the source of reference potential when in a closed condition,

second switching means coupled between the signal lines of the signal transmission line group of the second set and the source of reference potential for providing a second path between each signal line and the source of reference potential of less impedance than the first path when in a closed condition,

bistable means having a first and a second input connection and being coupled to said first switching means, said bistable means being operable when in a first condition to cause said first switching means to be in the closed condition and being operable when in a second condition to cause said first switching means to be in the open condition,

said bistable means being operable to be triggered from the second condition to the first condition in response to an input signal at the first input connection and to be triggered from the first condition to the second condition in response to an input signal at the second input connection,

said second switching means being coupled to the first input connection of the bistable means and being biased to the closed condition during the presence of an input signal at the first input connection;

whereby the presence of an input signal at the first input connection of said bistable means during coincident pulses to control lines of selected crosspoint switching circuits switches the bistable means to the first condition causing the associated first switching means to be closed and also closing the second switching means during the input signal thereby permitting sufficient current to flow through the controlled latching semiconductor devices of the selected crosspoint switching circuits to cause the controlled latching semiconductor devices to become conductive and establish a signal transmission path through the system, termination of the input signal to the first input connection of the bistable means opening the second switching means while the first switching means remains in the closed condition permitting sufficient holding current to flow through the controlled latching semiconductor devices of the selected crosspoint switching circuits, and subsequent input signal at the second input connection of the bistable means switching the bistable means to the second condition causing the first switching means to be opened thereby interrupting current flow through the controlled latching semiconductor devices of the selected crosspoint switching circuits causing them to become nonconductive and terminating the established signal transmission path through the system.

3,976,846

DIAL DEVICE FOR A TELEPHONE SET HAVING A FUNCTION OF PREVENTING TOLL DIALING

Kouichi Sekiguchi, 2-17-2, Saiwai-cho, Asaka, Saitama, and Akihiro Kobayashi, 4-35-1, Tanmachi, Kanagawa, Yokohama, Kanagawa, both of Japan

Filed July 3, 1974, Ser. No. 485,624
Claims priority, application Japan, July 6, 1973, 48-76331; July 9, 1973, 48-76557
Int. Cl.² H04M 1/66
U.S. Cl. 179—18 DA 6 Claims

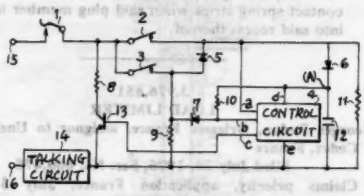
1. A dial device for a telephone set for preventing toll dialing, comprising:

a pair of line terminals;

a first series-circuit comprised of a hook switch, a dial impulse contact, a load capable of passing direct current and a talking circuit, the first series-circuit being connected to said line terminals;

a second series-circuit comprised of a control circuit having input and output terminals and a first diode in series with the output terminals, the second series-circuit being connected in parallel with the load;

a third series-circuit comprised of a minimum pause contact and a second diode, the third series-circuit being connected in parallel with said dial impulse contact;



means for connecting a first input terminal of said control circuit to a first junction between said dial impulse contact and said first diode to apply in use the logical AND combination of a dial impulse signal and a minimum pause signal to said first input terminal;

means for connecting a second input terminal of the control circuit to a second junction between said minimum pause contact and said second diode to apply a minimum pause signal to said second input terminal; and

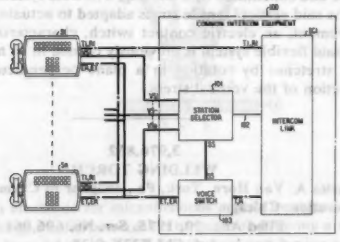
semiconductor switching means connected in parallel with said dial impulse contact for preventing the transmission of dialled impulses across said line terminals in response to the output of said control circuit when said dial impulse signal is a series of numbers representative of the toll dialling starting from a number 0 or numbers 10.

3,976,847

KEY TELEPHONE SYSTEM INTERCOM ARRANGEMENT

Richard Henry Bidlack, Boonton; Wayne Jay Egan, Eatontown, and Steven Gary Miller, Freehold Township, Monmouth County, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Nov. 12, 1975, Ser. No. 631,410
Int. Cl.² H04M 1/60
U.S. Cl. 179—99 **13 Claims**



1. In a key telephone system, an intercom arrangement comprising:

a plurality of key telephone station sets;

an intercom link for interconnecting any one of said key telephone station sets to any other of said key telephone station sets;

a station selector connected to said intercom link for receiving dialed digit data from a first one of said key telephone station sets which is connected to said intercom link;

a plurality of dedicated communication paths corresponding on a one-to-one basis to each of said plurality of key telephone station sets for connecting said station selector to each of said key telephone station sets;

each said key telephone station set including loudspeaker means for providing an audible representation of voice signals appearing on said dedicated communication path corresponding to said key telephone station set; and

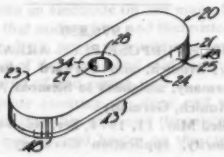
means responsive to dialed digit data from said first key telephone station set for establishing a unidirectional voice communication connection through said station selector from said intercom link to a called one of said key telephone station sets uniquely defined by said dialed digit data via the one of said dedicated communication paths corresponding to said called key telephone set.

3,976,848

DISPOSABLE NOISE REDUCING HEARING AID ATTACHMENT

Roger Q. Estes, c/o P.H. Shelledy Peyton Bldg., Spokane, Wash. 99201

Filed Aug. 21, 1975, Ser. No. 606,513
Int. Cl.² H04R 25/00
U.S. Cl. 179—107 R **6 Claims**



1. A disposable noise reducing hearing aid attachment for attaching to a hearing aid that has a housing with a sound inlet formed therein to transmit audible sound from the environment to an internal microphone, comprising:

a flexible pad;

said pad having an aperture formed therethrough for communicating with the sound inlet of the hearing aid to transmit audible sound from the environment to the hearing aid microphone;

a layer of flexible backing material operatively supporting said pad in which the backng material has a coating adhesive thereon for removably securing the attachment to the hearing aid housing;

a sound, moisture, and air filter associated with the pad aperture to (1) reduce the amplitude of audible noise transmitted from the environment to the hearing aid sound inlet; (2) prevent dust and other airborne particles from passing into the hearing aid sound inlet; and (3) absorb moisture; and

said filter being constructed at least in part by moisture absorbent fibers selected from a group consisting of wool and cotton.

3,976,849

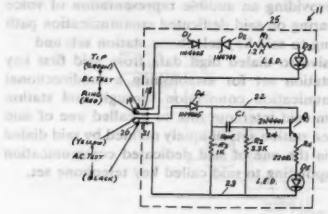
TELEPHONE WIRING TESTER

Louis W. Champan, Bellevue, Wash., assignor to Melco, Bellevue, Wash.

Filed Aug. 1, 1975, Ser. No. 601,048
Int. Cl.² H04M 1/24
U.S. Cl. 179—175.25 **8 Claims**

1. In combination with a four-terminal plug for connection of a telephone handset employing d.c. tip-ring voltage and a.c. lamp voltage coupled over d.c. and a.c. lines respectively, a

telephone line testing device for assuring proper connections of said voltages to said lines comprising a support provided with a four-contact jack adapted to receive the four-terminal handset plug connected to said d.c. and a.c. lines, said jack having two d.c. contacts and two a.c. contacts, a series circuit branch on said support including a first rectifier and a first electrical light-emitting device, circuit means connecting said



series circuit branch to the two d.c. contacts, a second circuit branch on said support comprising an a.c. amplifier including a d.c.-blocking input capacitor, a second electrical light-emitting device connected to the output of the amplifier, and a second rectifier connected in series with the input of the amplifier, and circuit means connecting said second circuit branch to the two a.c. jack contacts.

3,976,850

MULTIPLE PURPOSE PLUG ARRANGEMENT

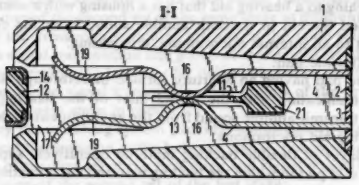
Walter Faber, Munich, and Gerhard Schmieg, Germering, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Mar. 11, 1974, Ser. No. 449,598

Claims priority, application Germany, Mar. 22, 1973, 2314419

Int. Cl.² H01R *33/30*

U.S. Cl. 200—51.1 **2 Claims**



1. A multiple-purpose plug arrangement, comprising: an insulator-material socket housing,

said housing forming a plurality of opening means therein, each said opening means having a closed end and an entrance opposite thereto;

a plurality of pairs of elongated, flexible contact sheet spring strips arranged in said opening means of said housing, each strip of each of said pairs of spring strips having a first end, a contact surface, and a camming portion formed therein and spaced sequentially apart therealong,

said ends of said pairs of said spring strips being secured in said closed end of said opening means of said housing,

said contact surface of each said spring strip resiliently engaging the contact surface of the other strip of each said pair,

said camming surfaces in each of said pairs being spaced from each other and forming a recess therebetween adjacent and directed towards said entrance of its respective said opening means;

a plug member selectively insertable into any one of said recesses of said pairs of contact spring strips, said plug member when moved into an operating position separating said contact surfaces of said one pair of spring strips by a distance;

a shaped recess provided in said insulator material housing and extending between said strips of each of said pairs of spring strips adjacent said contact surfaces thereof;

a cross-piece member arranged in said shaped recess; and

at least one flat insulator member extending from said cross-piece member and disposed in said housing, each said flat insulator member having a thickness less than the distance separating said contact surfaces of said pair of contact spring strips when said plug member is inserted into said recess thereof.

3,976,851

LOAD LIMITER

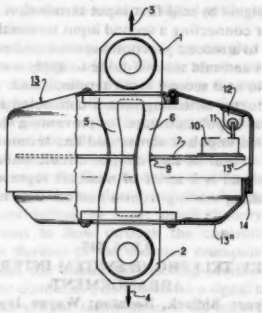
Georges Redon, Orleans, France, assignor to Unelec, Paris Cedex, France

Filed July 30, 1975, Ser. No. 600,478

Claims priority, application France, July 31, 1974, 74.26600; June 13, 1975, 75.18486

Int. Cl.² H01H *3/14*

U.S. Cl. 200—85 R **11 Claims**



1. Load limiter for lifting devices, setting off an electric signal when a vertical tensile stress is greater than a maximum value and constituted by a housing, a flexible system subjected to the said vertical tensile stress adapted to actuate, due to its movement, an electric contact switch, characterized in that the said flexible system is previously twisted in its middle part and stretches by rotation in a plane perpendicular to the direction of the vertical stress.

3,976,852

WELDING TORCH

Charles A. Van Horn, York, Pa., assignor to Chemetron Corporation, Chicago, Ill.

Filed Aug. 20, 1975, Ser. No. 606,061

Int. Cl.² B23K *9/28*

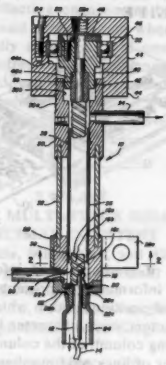
U.S. Cl. 219—75 **10 Claims**

1. In an electric welding torch adapted to hold an electrode, a combination comprising:

a helically fluted tube made of flexible material and adapted to surround a portion of an electrode inserted in said tube, and

means for mounting said tube in said torch and permitting

relative rotation of displaced portions of said tube along said electrode for selectively holding said electrode in



said tube by physical engagement of helical portions of said tube with said electrode and releasing said electrode.

3,976,853

NON-FUSIBLE ELECTRODE, IN PARTICULAR FOR TUNGSTEN INERT GAS WELDING AND A PROCESS FOR THE PRODUCTION THEREOF

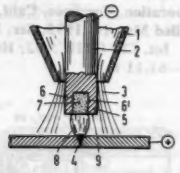
Hermann Trattner, and Hans Raab, both of Munich, Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Germany

Filed June 17, 1974, Ser. No. 479,846

Claims priority, application Germany, June 20, 1973, 2331558

Int. Cl.² B23K *35/04*

U.S. Cl. 219—145 **3 Claims**



1. An electrode for microfusion tungsten inert gas welding comprising, a solid non-fusible tungsten rod having a working tip end from which an arc is struck, said end having a central recess of a depth substantially equal to the rod diameter and a diameter at the working tip not greater than about half the diameter of the rod, said recess having rough surface walls of the order of 10 μm, said recess being filled with powdered high melting electron emission material sintered in situ in the recess and forming a plug interlocked with the rough recess walls.

3,976,854

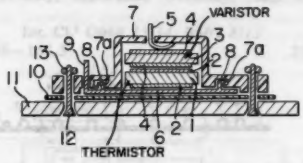
CONSTANT-TEMPERATURE HEATER

Kazuo Ishikawa, Kadoma; Yoshio Irie, Nara, and Hideo Mifune, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed July 31, 1974, Ser. No. 493,224

Int. Cl.² H05B *1/02, 3/12;* **H01C** *7/02*

U.S. Cl. 219—505 **4 Claims**



1. A contant-temperature heater comprising an electrically insulating casing having an open end and a closed end opposite the open end,

a heat source comprising a thermistor with a positive temperature coefficient of resistance and having electrodes formed on at least two major surfaces thereof,

a varistor having electrodes formed on at least two major surfaces thereof, said thermistor and said varistor being stacked upon one another within said casing such that an electrode on one major face of said varistor is in electrical contact with an electrode on one major face of said thermistor so that said varistor and thermistor are electrically and thermally in series with said varistor disposed at the closed end of the casing and said thermistor disposed at the open end of said casing, and

a radiator plate covering the open end of said casing in opposed relationship with said thermistor,

a first terminal for said heater on the closed end of said casing,

an elastic electrically conductive member interposed between the closed end of said casing and the electrode on the other major face of said varistor for biasing said thermistor against said radiator plate through said varistor and electrically connecting said first terminal to said last mentioned electrode,

an electrically insulating sheet interposed between the thermistor and the radiator plate,

a plate-shaped terminal in physical and electrical contact with the electrode on the other major face of said thermistor and forming a second terminal for said heater, and

said insulating sheet comprising a heat-resisting electrical insulating sheet interposed between said plate-shaped terminal and said radiator plate, whereby said radiator plate is electrically insulated from said thermistor and in good thermal relationship therewith so as to receive heat from said thermistor for dissipation.

3,976,855

ELECTRICAL HEATING MAT

Horst Dieter Altmann, Gruendau-Lieblos, and Eberhard Haupt, Gruendau-Rothenbergen, both of Germany, assignors to Firma Wilhelm Haupt, Rothenbergen, Germany

Continuation-in-part of Ser. No. 389,566, Aug. 20, 1973, Pat. No. 3,874,910. This application Dec. 6, 1974, Ser. No. 530,208

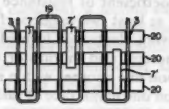
Claims priority, application Germany, Aug. 22, 1972, 2241201; Sept. 18, 1972, 2245742

Int. Cl.² H05B *3/34;* **H01C** *3/12*

U.S. Cl. 219—532 **9 Claims**

1. An electrical heating mat comprising electrical resistance heating wire means in a loop formation with substantially straight leg portions between curved portions, a plurality of spaced apart spacer strip means to hold said heating wire means in said loop formation, each of said spacer strip means including a strip body having a given width, open sided wire

receiving means in each strip body, said wire receiving means extending substantially across the width of each strip body, said wire receiving means having an inner free space correlated to the outer dimension of the wire means so as to assure a snap-fit reception of the wire means in the wire receiving means, said leg portions of said wire means extending substantially across said spacer strip means, said spacer strip means



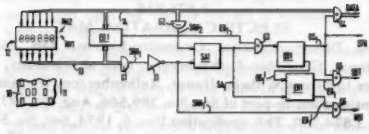
further comprising coupling means arranged at one end of said spacer strip body for interconnecting the longitudinally aligned spacer strip means of several mats into larger units, said coupling means comprising a snap-in member at one end of said strip means, said snap-in member having an outer dimension sized to snap into the wire receiving means at the end of an adjacent spacer strip means.

3,976,856

SELF-CLOCKING PUNCHED RECORD READER

William Ramage, Larkhall, England, assignor to Honeywell Information Systems Limited, Brentford, England

Filed Mar. 12, 1975, Ser. No. 557,701
Int. Cl.² G06K 7/016
U.S. Cl. 235—61.11 R 5 Claims



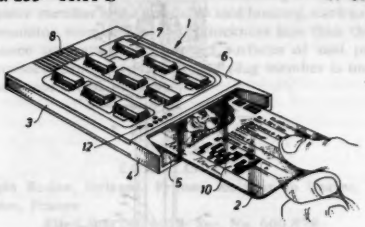
1. A self-clocking punched record reader comprising: two rows of sensors, corresponding sensors in the two rows being arranged to sense areas of the record which are longitudinally displaced but overlapping; a comparator, fed from the two rows of sensors, for determining when the outputs of the two rows of sensors are identical; and strobe signal generating circuitry for generating a strobe signal on detection of such identity.

3,976,857

METHOD AND AN ARRANGEMENT FOR READING CODED INFORMATION FROM A DATA CARRIER

Knut Goran Högberg, Vallingby, and Olof Wilhelm Meurling, Osmo, both of Sweden, assignors to AB ID-Kort, Sweden

Filed Nov. 29, 1974, Ser. No. 528,570
Claims priority, application Sweden, Nov. 30, 1973, 7316254
Int. Cl.² G06K 7/10; G08C 9/06
U.S. Cl. 235—61.11 E 47 Claims



1. A method of reading coded information from a data carrier in which information is present in the form of at least one line of coded positions and in which the coded positions constitute characters, each character including the positions in a corresponding column of the columns formed by a predetermined number of lines, said number of lines including one in which each position in a specific line constitutes a character, the method comprising the steps of:

moving the data carrier and reader means relatively to one another so that said at least one line is relatively displaced past said reader means;

reading the characters thus passing said reader means;

detecting the direction of the data carrier motion relatively to said reader means;

increasing a count in dependence upon the number of characters which pass said reader means if the direction of the relative motion is opposite to a given read-out direction;

reducing the count in dependence upon the number of characters passing said reader means if the direction of the relative motion corresponds with the given read-out direction until the count reaches zero; and

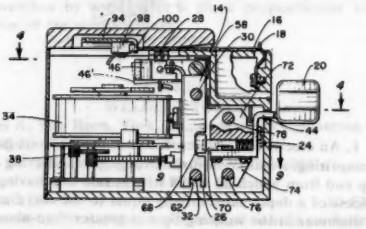
feeding out the result of read-out of a character read if the direction of the data carrier relative motion corresponds with the given read-out direction and the count is zero.

3,976,858

CARD READER ASSEMBLY WITH MANUAL TRANSDUCER

Marion W. Haun, Torrance, Calif., assignor to American Magnetics Corporation, Torrance, Calif.

Filed May 16, 1975, Ser. No. 578,225
Int. Cl.² G11B 5/52; H04Q 3/02
U.S. Cl. 235—61.11 D 8 Claims



1. Apparatus for reading out data signal recorded on a substantially flat card comprising:

frame means for holding a card during readout,

said frame means including elongate rail means paralleling the plane of the card,

carrier means reciprocable on said rail means,

readout head means mounted on said carrier means and having a face adapted to bear against a card to detect signals recorded on the card,

motive means for moving said carrier means toward one end of said rail means,

abutment means at said one end of said rail means,

manually operable latch mechanism for moving said carrier means toward the opposite end of said rail means,

latch means for effecting engagement between said latch mechanism and said carrier means when said latch mechanism is manually moved to said one end of said rail means, and for effecting disengagement when said latch mechanism has moved said carrier means to said opposite end of said rail means,

said disengagement enabling said motive means to return said carrier to said abutment means.

3,976,859
PRESETTABLE MULTI-STAGE BINARY-CODED DECIMAL COUNTERS

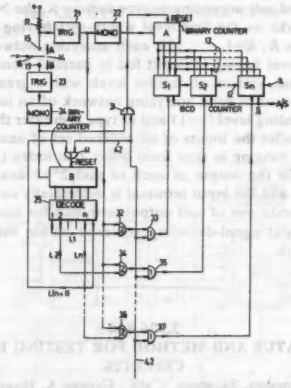
Stuart Melville Christie, Midlothian, and Alexander Turnbull Shepherd, Edinburgh, both of Scotland, assignors to Ferranti Limited, Hollinwood, England

Filed Feb. 26, 1975, Ser. No. 553,287

Claims priority, application United Kingdom, Mar. 6, 1974, 10150/74

Int. Cl.² H03K *21/36*

U.S. Cl. 235—92 PE **8 Claims**



1. A multi-stage binary-coded decimal counter which includes a plurality of counter stages each having four preset data input points capable of being energised in parallel binary fashion, a presetting counter having four output points connected to the corresponding four preset data input points of each of the counter stages and arranged to apply to all stages of the multi-stage counter binary signals representing a decimal digit in terms of the number held in the presetting counter at any instant, actuating means connected to the presetting counter for applying thereto a predetermined number of pulses, stage-selecting means connected to the stages of the multi-stage counter for selecting the stage to which the output of the presetting counter is to be applied, and inhibiting means including gating means connected to the stage-selecting means to prevent the latter means from selecting a stage of the multi-stage counter except while pulses are being applied to the presetting counter by the actuating means.

3,976,860
METHOD AND ARRANGEMENT FOR CONVERSION OF A DIGITAL MEASURED VALUE

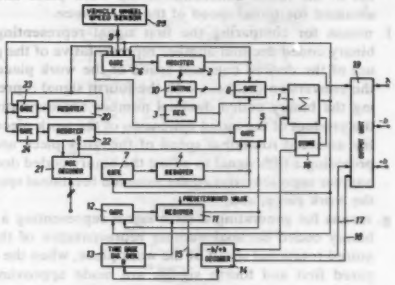
Jurgen Gerstenmeier, Waldhilsbach; Wolfgang Korasiak, Ketsch; Thomas Morath, Heidelberg, and Hans Muller, Sandhausen, all of Germany, assignors to Teldix GmbH, Heidelberg, Germany

Filed Aug. 7, 1975, Ser. No. 602,673

Claims priority, application Germany, Aug. 8, 1974, 2438273

Int. Cl.² G06F *15/34*; B60T *8/12*

U.S. Cl. 235—151.3 **22 Claims**



12. An arrangement for the conversion of a constantly occurring measured value in digital form into a filtered digital value comprising comparison means for comparing the instantaneous measured value with a digital value determined by previous measurements, means for evaluating the difference of the compared values in accordance with a predetermined conversion function to provide an evaluated value and adding means for adding the evaluated value, correct with respect to sign, to said digital value, determined by previous measurements.

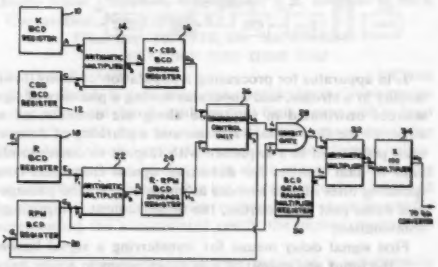
3,976,861
APPARATUS FOR MAINTAINING A CONSTANT SURFACE SPEED OF A ROTATING WORK PIECE BEING CUT BY A MOVING CUTTING TOOL

Clarence Roy Edwards, Stuartsdraft, Va., and John James Nolan, Lyndonville, Vt., assignors to General Electric Company, New York, N.Y.

Filed June 27, 1975, Ser. No. 591,166

Int. Cl.² B23Q *5/08*

U.S. Cl. 235—151.11 **3 Claims**



1. Apparatus for maintaining a constant surface speed of a rotating work piece being cut by a moving cutting tool, comprising:

a. means for storing a first signal representing a binary coded decimal number further representative of the product of the desired constant surface speed of the work piece and a conversion constant;

b. a register for receiving a second signal representing a binary coded decimal number further representative of the current radial dimension of the work piece being cut;

c. means for storing a third signal representing a binary coded decimal number initially representative of an assumed rotational speed of the work piece;

d. means for arithmetically multiplying the binary coded decimal number representative of the radial dimension of the work piece by the binary coded decimal number representative of the assumed rotational speed of the work piece;

e. means for storing a fourth signal representing a binary coded decimal number further representative of the product of the radial dimension of the work piece and the assumed rotational speed of the work piece.

f. means for comparing the first signal representing the binary coded decimal number representative of the product of the desired constant speed of the work piece and the conversion constant with the fourth signal representing the binary coded decimal number representative of the product of the radial dimension of the work piece and the assumed rotational speed of the work piece and for providing a fifth signal to adjust the binary coded decimal number representative of the assumed rotational speed of the work piece; and

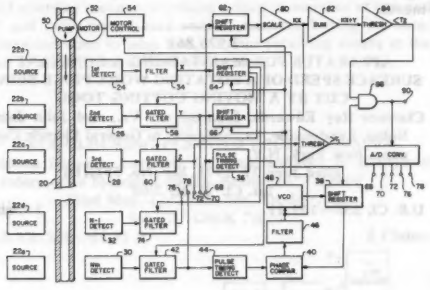
g. means for generating a sixth signal representing a final binary coded decimal number representative of the required rotational speed of the work piece, when the compared first and fourth signals are made approximately equal, to control the speed of a motor that drives a spindle which holds the work piece.

3,976,862

FLOW STREAM PROCESSOR

Raul Curbelo, Lexington, Mass., assignor to Block Engineering, Inc., Cambridge, Mass.

Filed Mar. 18, 1975, Ser. No. 559,482
Int. Cl.² G06F *15/20*; G01N *33/16*; G06F *15/42*
U.S. Cl. 235—151.34 **15 Claims**



1. In apparatus for processing a population of items flowing serially in a stream, said apparatus having a plurality of signal sources distributed in sequence along the direction of and adjacent the flow of said stream, and a plurality of detectors each positioned in a sequence with respect to corresponding ones of said sources for detecting signals from said corresponding ones of said sources as modulated by the passage of said items past said sources, the improvement comprising, in combination;

First signal delay means for transferring a signal between the input and output of said delay means in a time period variable in accordance with a timing signal, the input of said delay means being coupled to the output of the first detector of said sequence of detectors; and

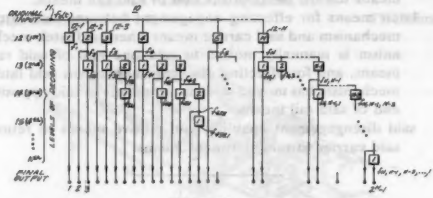
means for generating said timing signal proportionally to the difference in phase between each signal appearing at the output of said delay means and each corresponding modulated signal detected by the last of the detectors in said sequence.

3,976,863

OPTIMAL DECODER FOR NON-STATIONARY SIGNALS

Alfred Engel, Trenton, N.J., assignor to Alfred Engel, Trenton, N.J.

Filed July 1, 1974, Ser. No. 484,420
Int. Cl.² G01R *23/00*; G06F *15/34*
U.S. Cl. 235—152 **32 Claims**



1. A decoder network for information-theoretically completely identifying all constituents of an input signal, said decoder network comprising:

an input terminal receiving the input signal;

2^N output terminals where N is greater than 1;

2^N-1 analyzing networks which are classified into at least N distinct types, each of said analyzing networks having an input and an output; said analyzing networks when looked at as 2-poles being connected after the input terminal, which input terminal is labeled level zero, to form the linking branches of a binomial tree graph network of N+1 sequential levels with $\binom{N}{\nu}$, where ν=1, . . . , N, analyzing networks per level ν; the analyzing networks of each level ν being selectively connected as ordered sets according to type indices K, the N analyzing networks on the first level where ν=1 having sequential indices K, K=1, . . . , N, each analyzing network on the first level having its input fed in parallel from the input terminal, and on all further levels with ν greater than 1 the output of each analyzing network of an immediately preceeding level ($\nu-1$) and of type K greater than 1 feeds in parallel the inputs of an ordered set of analyzing networks ranging in type from index 1 to index ($K-1$); and wherein the output of each of said 2^N-1 analyzing networks and the input terminal is individually connected to a separate one of said output terminals for monitoring of the input-signal-decoding achieved within said decoder network.

3,976,864

APPARATUS AND METHOD FOR TESTING DIGITAL CIRCUITS

Gary B. Gordon, Saratoga, Calif.; George A. Haag, Colorado Springs, Colo.; Jan R. Hofland, Sunnyvale, Calif., and Daniel I. Kolody, Black Forrest, Colo., assignors to Hewlett-Packard Company, Palo Alto, Calif.

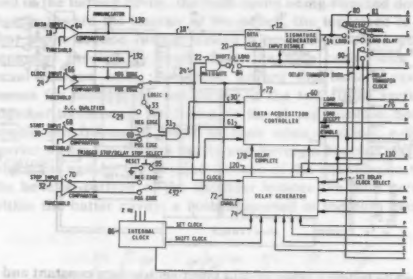
Filed Sept. 3, 1974, Ser. No. 502,326
Int. Cl.² G06F *11/00*
U.S. Cl. 235—153 AC **21 Claims**

1. A method for testing a digital electronic circuit comprising the steps of:

generating a first signature word having a predetermined length from a first digital signal available during a first period of time at a selected location in the digital electronic circuit operating in a predetermined mode by combining each of a selected plurality of bits of the digital signal with preselected other ones of the selected plurality of bits;

generating a second signature word having the same predetermined length from a second digital signal available during a second period of time at the selected location in the digital electronic circuit operating in the predetermined mode by combining each of the same selected

plurality of bits of the digital signal with the same preselected other ones of the selected plurality of bits; and



comparing the first signature word with the second signature word and indicating when there is a difference between the first signature word and the second signature word.

3,976,865

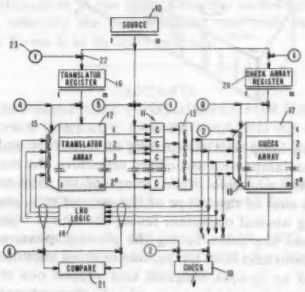
ERROR DETECTOR FOR AN ASSOCIATIVE DIRECTORY OR TRANSLATOR

Thomas Arthur Enger, Wappingers Falls, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 15, 1975, Ser. No. 604,970

Int. Cl.² G11C *29/00*; H03K *13/34*

U.S. Cl. 235—153 AK **5 Claims**



1. Error detection apparatus comprising:

a binary word source;

translator means, including input means connected to said binary coded word source for receiving a first plural-bit binary word, a plurality of registers for storing a corresponding plurality of said first words, and output means, including identifying means connected and responsive to said input means and said register means for producing a second plural-bit binary word which is related to said first work by identifying one of said plurality of register means storing one of said first words equal to a said first word received from said binary word source; and

check means, connected to said binary word source and the output of said translator, including check signalling means for indicating the proper identification of one of said plurality of registers.

3,976,866

ADDITION CONTROL SYSTEM

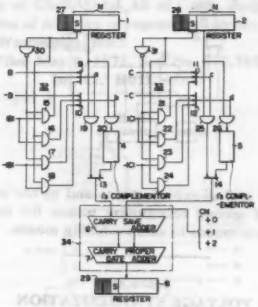
Masanori Motegi; Keiichiro Uchida, both of Kawasaki; Minoru Koshino, Yokohama; Takatoshi Muraoka, Kyoto, and Shigeru Nagasawa, Yokohama, all of Japan, assignors to Fujitsu Ltd., Kawasaki, Japan

Filed Sept. 2, 1975, Ser. No. 609,698

Claims priority, application Japan, Sept. 5, 1974, 49-102217

Int. Cl.² G06F *7/385*

U.S. Cl. 235—168 **12 Claims**



1. A system for controlling the addition of an addend number and an augend number, wherein each number is represented with N-bits, including a sign bit, in a 2's complement notation, said system comprises: a sign control circuit means for designating the sign of the respective addend and augend in response to addend sign command signals and augend sign command signals; an adder circuit means for receiving said sign designated addend and augend from said sign control circuit means and producing an output which is a sum of the sign designated addend and sign designated augend; wherein said adder circuit means comprises a carry save adder circuit, a carry proper gate adder circuit and a corrective number gate circuit, which corrects said sum according to the condition of said sign designated addend and said sign designated augend being respectively received by the adder circuit means in the form of 1's complements.

3,976,867

CALCULATOR TIMER WITH SIMPLE BASE-6 CORRECTION

Alleyne Resue Campbell, Willingboro, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Dec. 10, 1975, Ser. No. 639,404

Int. Cl.² G06F *7/50*; G04F *5/00*

U.S. Cl. 235—169 **1 Claim**

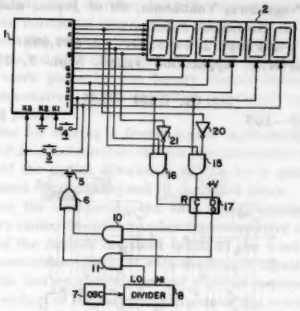
1. In a timing system comprising a calculator circuit means having an accumulated results output digit means with at least a tens of seconds digit means, display means responsive to the accumulated result output digit means for providing an indication of accumulated results, timer clock means for producing periodically spaced pulses having a period equal to a desired timing period, switching means responsive to clock means for incrementing the accumulated result, the improvement comprising:

fast clock means for producing pulses at a substantially greater rate than said timer clock means;

first recognition means responsive to said accumulated results output means for producing an output signal when said tens of seconds digit means has a value of six;

second recognition means responsive to said accumulated results output means for producing an output signal when said tens of seconds digit means has a value of zero; and

clock selection means responsive to the output signal from said first recognition means for coupling said fast clock



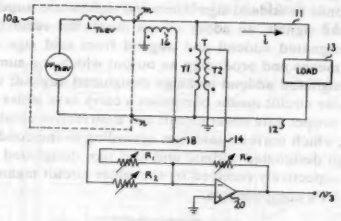
means to said switching means and to the output signal from said second recognition means for coupling said timer clock means to said switching means.

3,976,868

VOLTAGE SYNTHESIZATION

Lawrence J. Lane, Stuarts Draft, Va., assignor to General Electric Company, Salem, Va.

Filed Aug. 26, 1975, Ser. No. 607,785
Int. Cl.² G06G 7/48; G08B 29/00
U.S. Cl. 235—184 15 Claims



1. A circuit for the simulation of a supply voltage which supplies current to a load from a pair of accessible terminals, comprising:

a. first means to produce a first signal having a value proportional to the voltage at said terminals;

b. second means to produce a second signal having a value proportional to the rate of change, with respect to time, of the load current;

c. means to ratio said first and second signals; and,

d. means to combine the ratioed first and second signals to develop an output signal simulating said supply voltage.

3,976,869

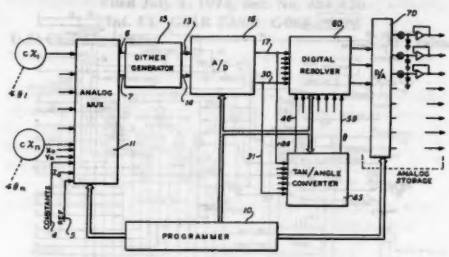
SOLID STATE RESOLVER COORDINATE CONVERTER UNIT

Carl Stella, Stockholm, and Edward Costello, Paterson, both of N.J., assignors to The Singer Company, Little Falls, N.J.

Filed Sept. 27, 1974, Ser. No. 509,776
Int. Cl.² G06F 7/38
U.S. Cl. 235—189 17 Claims

1. Apparatus for performing digital coordinate transformation on *n* dimensional analog input data and ultimate outputting of the *n* dimensional data in a form compatible with analog utilization equipment comprising:

a source of input vector and rotation angle data, and means for performing coordinate transformation on pairs of said input vector data through a given rotation angle



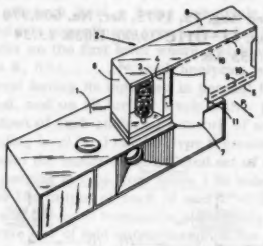
while holding other of said input vector data constant and iterating in a like manner to perform coordinate transformation on different pairs of said input vector data.

3,976,870

FLASH LAMP UNIT

Ernst Machiel Schmidt, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 21, 1975, Ser. No. 551,634
Claims priority, application Netherlands, Mar. 6, 1974, 7402999
Int. Cl.² G03B 15/02
U.S. Cl. 240—1.3 7 Claims



1. A flash lamp unit comprising at least first and second rows of flash lamps with associated reflectors, the main direction of light emanation of the lamps of the first row being opposite to that of the lamps of the second row, one of said rows during normal operation facing the object being photographed, and the other facing the photographer, a housing disposed about said flash lamps, said housing including at least one strip of an opaque material, said at least one strip being disposed opposite said first row of reflectors whereby during initial operation of said unit, said second row of flash lamps is used and subsequent thereto, said first strip is removed and said first row of flash lamp is used.

3,976,871

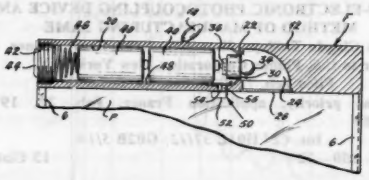
HANDBAG WITH MEANS FOR ILLUMINATING THE INTERIOR THEREOF

Ira W. Atherton, 508 Broadway, East Alton, Ill. 62024

Filed Apr. 29, 1975, Ser. No. 572,855
Int. Cl.² A45C 15/06
U.S. Cl. 240—6.45 P 4 Claims

1. A handbag comprising: a pouch having a hollow interior; a frame attached to the pouch such that the pouch depends from the frame, the frame having first and second sections which move relative to each other between open and closed positions and are provided with generally parallel longitudinal top pieces, the top pieces being in juxtaposition when the

frame is closed and being spread apart when the frame is open so as to expose the interior of the pouch and provide access thereto, the top piece on the first frame section having a battery cavity therein and a bulb cavity located beyond the end of the battery cavity, the bulb cavity being directed downwardly toward the interior of the pouch, the top piece of the first frame section further having a beveled shoulder which separates the battery cavity from the bulb cavity with the bevel thereon being presented toward the battery cavity; means for holding the top pieces of the two frame sections together to maintain the frames in the closed position, but to enable the frames to move to their open position; a bulb carrier within the battery cavity and having a beveled surface which fits against the beveled surface of the shoulder so that the beveled surface of the shoulder locates the bulb carrier within the batter cavity; a bulb supported in the bulb carrier



such that the bulb projects into the bulb cavity; at least one battery in the battery cavity; a light transmitting element mounted on the top piece of the first frame section flush with the downwardly presented surface of that frame section, the light transmitting element being extended across the bulb cavity in the top piece of the first frame section such that the bulb is separated from the interior of the pouch by the light transmitting element, whereby the light transmitting element protects the bulb from objects within the pouch; and switch means on the top piece of the first frame section for placing the bulb in circuit with the battery when actuated, the switch means including a manually operated actuating element which is located on the top piece of the first frame section and projects therefrom in the same direction as the bulb cavity is directed, whereby the switch means may only be operated when the frame is in its open position.

3,976,872

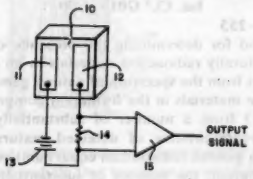
GALLIUM PHOSPHIDE PHOTODETECTOR HAVING AN AS-GROWN SURFACE AND PRODUCING AN OUTPUT FROM RADIATION HAVING ENERGIES OF 2.2 EV TO 3.8 EV

Paul E. Petersen, Minnetonka, and Richard G. Schulze, Hopkins, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Continuation of Ser. No. 420,174, Nov. 29, 1973, Pat. No. 3,915,754. This application Apr. 7, 1975, Ser. No. 565,920

Int. Cl.² H01J *39/12*

U.S. Cl. 250—211 R **18 Claims**



15. A photodetector comprising:

gallium phosphide means for producing a photosignal in response to radiation of energies between about 2.2 eV and about 3.8 eV, the gallium phosphide means comprising:

a bulk region for producing a photosignal in response to radiation of energies between about 2.2 eV and about 2.8 eV, and

a surface region for producing a photosignal in response to radiation of energies between about 2.8 eV and about 3.8 eV; and

electrical contact means attached to the surface region for deriving a photosignal from the gallium phosphide means.

3,976,873

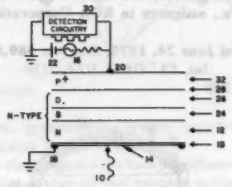
TUNABLE ELECTROABSORPTIVE DETECTOR

Nicholas Bottka, Ridgecrest; Edward A. Teppo, and Victor L. Rehn, both of China Lake, all of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 8, 1975, Ser. No. 575,769

Int. Cl.² H01L *15/00*

U.S. Cl. 250—211 J **4 Claims**



1. An optical radiation electroabsorptive device for selectively modulating transmitted optical frequencies and detecting other optical wavelengths of incident radiation frequencies near the absorption edge of the device comprising:

a semiconductor structure supportive of the Franz-Keldysh effect by shifting the absorption edge of the structure in response to application of an electric field, having a plurality of layers of N-type material and at least one layer of P-type material, wherein one of the layers of the N-type material is the first of said layers in the path of said radiation, the layer of P-type material is most remote of said layers from the source of said radiation, and one other layer of said N-type material is adjacent said P-type material; and

means coupled to said structure for selectively establishing said electric field and predeterminedly shifting said absorption edge;

such that frequencies of said incident radiation are selectively modulated and absorbed by said structure.

3,976,874

IMAGE TUBE INCORPORATING A BRIGHTNESS-DEPENDENT POWER SUPPLY

Gerhard Lange, and Detlef Falk, both of Bremen, Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 478,607, June 12, 1974, abandoned. This application Oct. 6, 1975, Ser. No. 619,775

Claims priority, application Germany, June 16, 1973, 2330738

Int. Cl.² H01J *31/50*

U.S. Cl. 250—213 VT **3 Claims**

1. A noctoviser having automatic brightness compensation, comprising:

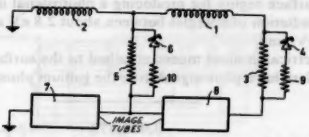
an image intensifier tube;

a high-voltage generator for producing a substantially constant high-voltage;

a resistor directly connecting said high-voltage generator to said image intensifier tube to reduce the high-voltage delivered to said tube as the tube current increases; and

an avalanche diode connected in parallel with said resistor to limit the high-voltage reduction by said resistor in order to prevent said tube from switching-off at very high

brightness input levels, said parallel connected resistor and diode effectively varying the high-voltage delivered



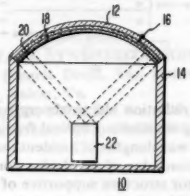
to said tube such that the output luminescence of said tube remains approximately the same at all brightness input levels.

3,976,875

PHOTODETECTOR FILTER STRUCTURE

Ralph Warren Engstrom, and David Eugene Bowser, both of Lancaster, Pa., assignors to RCA Corporation, New York, N.Y.

Filed June 24, 1975, Ser. No. 589,853
Int. Cl.² G01J 3/34, 3/50
U.S. Cl. 250—226 7 Claims



1. An optical filter structure for a photodetector comprising:

a transparent dome in the shape of a segment of a spherical shell of uniform thickness, said dome positioned in front of the photodetector with a concave surface of the dome facing the photodetector so that light passing through the dome normal to the dome's surface will intersect at the center of the photodetector;

an interference filter on the surface of the dome; and

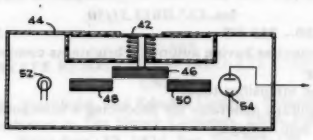
an absorption filter between the dome and the photodetector.

3,976,876

SIGNAL CONTROL APPARATUS

Dale C. Brocker, 19525 Forest Ave., Castro Valley, Calif. 94546

Division of Ser. No. 264,077, June 19, 1972, Pat. No. 3,818,369. This application June 3, 1974, Ser. No. 475,660
Int. Cl.² G02B 5/14
U.S. Cl. 250—227 3 Claims



1. Signal control apparatus which comprises

a light source,

two spaced but aligned fixed fibre-optic sections arranged to receive light from said source,

a movable fibre-optic section arranged for movement between axially-adjoining aligned and mis-aligned positions relative to said fixed fibre-optic sections,

an actuating member connected to said movable fibre-optic section to effect motion thereof,

light sensitive means aligned with said fixed fibre-optic sections for receiving light energy transmitted through said fixed and movable fibre-optic sections when they are aligned,

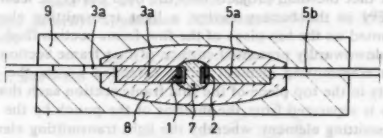
a sealed housing containing said light source, said fibre-optic sections and said light receiving means, and having an opening therein, and said actuating member constituting a resilient member sealed at its periphery to said housing to close the opening therein.

3,976,877

OPTO-ELECTRONIC PHOTOCOUPLING DEVICE AND METHOD OF MANUFACTURING SAME

Jacques Claude Thillays, Herouville Saint Clair, France, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 7, 1975, Ser. No. 547,992
Claims priority, application France, Feb. 22, 1974, 74.06089
Int. Cl.² H01L 31/12; G02B 5/14
U.S. Cl. 250—227 13 Claims



1. An opto-electronic photocoupling device of the type comprising a semiconductor light emitter and a semiconductor photosensitive receiver, which are coupled optically by a light conductor and are each connected to electric outputs, the improvement wherein the light conductor is constituted by an oblong mass of a first transparent resin having a relatively high index of refraction and embedded in a second transparent resin, the value of the index of refraction of the said second transparent resin being lower than that of the index of refraction of the said first transparent resin, said light emitter and said photosensitive receiver being embedded in opposed manner in said first resin.

3,976,878

NATURAL GAMMA RAY SPECTRUM ANALYSIS TECHNIQUE

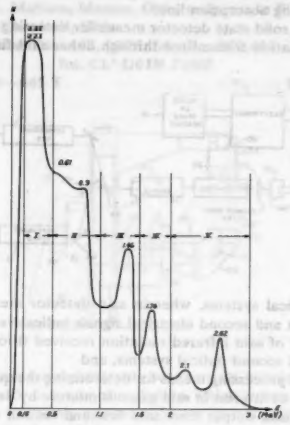
Philippe Chevalier, Verrieres Le Buisson, France, and Bronislav Seeman, Ridgefield, Conn., assignors to Schlumberger Technology Corporation, New York, N.Y.

Filed Sept. 27, 1974, Ser. No. 510,103
Claims priority, application France, Oct. 1, 1973, 73.35064
Int. Cl.² G01V 5/00
U.S. Cl. 250—253 24 Claims

1. A method for determining the presence of a selected number of naturally radioactive materials in an earth formation of interest from the spectrum of natural gamma radiation emitted by the materials in the formation comprising:

deriving (1) from a number of substantially contiguous spectra representative of detected, naturally emitted, formation gamma radiation an equal number of representations thereof, the number of substantially contiguous spectra being equal to and no more than the number of radioactive materials selected and the range of energy values of each spectrum including at least one energy peak characteristic of at least one of the selected radioactive materials and (2) representations of at least one additional spectrum that includes at least one energy

peak characteristic of at least one of the selected radioactive materials, that is defined by a range of energy values entirely below the range included within the substantially contiguous spectra, and has energy range limits generally



located in portions of the detected gamma radiation spectrum having a low slope; and

combining the representations to compute the presence of the selected materials from the substantially contiguous spectra and at least one additional spectrum.

3,976,879

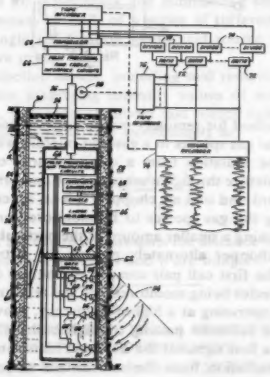
WELL LOGGING METHOD AND APPARATUS USING A CONTINUOUS ENERGY SPECTRUM PHOTON SOURCE

Ronald E. Turcotte, West Redding, Conn., assignor to Schlumberger Technology Corporation, New York, N.Y.

Filed May 22, 1975, Ser. No. 580,398

Int. Cl.² G01V 5/00

U.S. Cl. 250—266 **26 Claims**



1. A method of detemining a characteristic of the media surrounding a borehole that traverses an earth formation and in which a high-intensity source has been pulsed to emit repetitive bursts of a continuous energy spectrum of photons that penetrate the media, comprising the steps of:

obtaining at least three indications of photons returning to a borehole as a result of the interaction of the emitted photons and the surrounding media, each indication being obtained at a different separation from the source along the axis of a borehole; and

comparing the indications to determine at least two representations of a characteristic of the media surrounding a borehole.

3,976,880

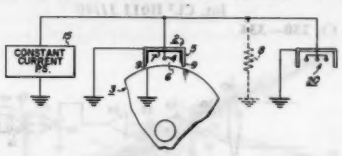
CORONA STABILIZATION ARRANGEMENT

Joseph A. Brunelle, West Webster; George J. Maszle, Ontario, and Thomas J. Scudder, West Webster, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Oct. 29, 1975, Ser. No. 626,677

Int. Cl.² G03G 15/00, 13/00

U.S. Cl. 250—324 **2 Claims**



1. In combination,

a housing,

an electrostatic reproduction system including an imaging surface, located in said housing,

a first corona discharge device located adjacent said surface for depositing charge on said imaging surface, said device including a first electrode and a first shield partially surrounding said electrode,

a second corona discharge device located remote from said imaging surface and inoperative to deposit charge on said surface, said second device including a second corona discharge electrode and an adjacent conductive charge collecting shield, said first and second corona devices connected in electrical parallel with each other, and

a constant current power supply for applying a corona energizing potential to said first and second electrodes.

3,976,881

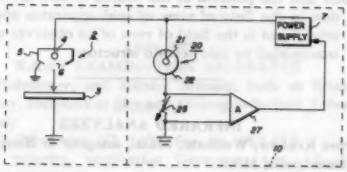
ARRANGEMENT FOR STABILIZING CORONA DEVICES

Delmer G. Parker, Irondequoit, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Oct. 29, 1975, Ser. No. 626,816

Int. Cl.² G03G 15/00

U.S. Cl. 250—324 **4 Claims**



1. In combination, an

imaging surface,

a first corona discharge device located adjacent said surface for depositing charge on said imaging surface, said device including a first electrode and a first shield partially surrounding said electrode,

power supply means for applying a corona energizing potential to said first electrode,

a housing within which said first corona device and imaging surface are located,

a second corona discharge device located within said housing remote from said imaging surface and inoperative to deposit charge on said imaging surface, said second device comprising a second corona dischage electrode and

an adjacent conductive surface for collecting charge emitted from said second corona device,

electrical means for developing a control signal which is a function of the rate at which said second device is depositing charge on said adjacent surface, and

means for varying said power supply means in response to said control signal.

3,976,882

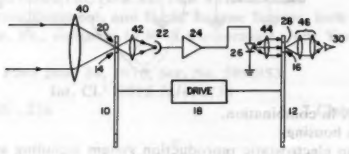
INVISIBLE RADIATION IMAGING DEVICE

Lyman F. VanBuskirk, Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed June 23, 1975, Ser. No. 589,094

Int. Cl.² H01J 31/49

U.S. Cl. 250—334 **5 Claims**



1. An imaging apparatus for imaging invisible subjects into the visible, comprising:

first and second structures having matched patterns of apertures;

means for moving said structures in synchronism;

detecting means between said structure for detecting invisible radiation transmitted by the aperture of said first structure as said apertures are moved in relationship to said detecting means by said moving means, and for providing an electrical output responsive to said detection; and

a source of visible light normally not emitting and rendered emitting in response to said electrical output aligned with the apertures of said second structure;

wherein visible light is transmitted by the apertures of said second structure as they move in relationship to said source of visible light in a corresponding relationship to transmission of said invisible radiation by the apertures of said first structure;

such that the position of the source of said invisible radiation in the field of view of said apparatus appears as a bright spot in the field of view of an observer to the light transmitted by said second structure.

3,976,883

INFRARED ANALYZER

Burton Krakow, Waltham, Mass., assignor to Honeywell Inc., Minneapolis, Minn.

Filed May 10, 1973, Ser. No. 359,162

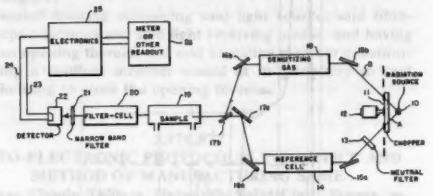
Int. Cl.² G01H 21/26

U.S. Cl. 250—343 **16 Claims**

1. In an apparatus for the selective determination of a gas of interest in a gaseous mixture wherein said gas of interest has a known characteristic infrared absorption spectrum, including a source of infrared radiation, first and second optical systems; said first optical system comprising first filter cell means containing said gas of interest, sample cell means for containing a sample of gas to be analyzed, said second optical system comprising said sample cell, first radiation directing means for directing said infrared radiation through said first optical system, second radiation directing means for directing said infrared radiation through said second optical system, the improvement comprising, in combination:

nonabsorbing optical filtering means for receiving said infrared radiant energy transmitted through either said first or said second optical systems wherein said filtering means passes a selected narrow portion of the infrared spectrum in which said gas of interest has at least one strong absorption line;

single solid state detector means for detecting said infrared radiation transmitted through either said first or second



optical systems, wherein said detector means produces first and second electrical signals indicative of the intensity of said infrared radiation received through said first and second optical systems, and

signal processing means for determining the quantity of said gas of interest in said gaseous mixture by deriving a comparison output from said first and second electrical signals.

3,976,884

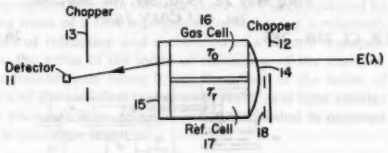
METHOD FOR REMOTE MONITORING OF GASEOUS PRODUCTS

Lawrence Lee Acton; Ervin Roy Bartle, Jr., and Gordon Dennis Hall, all of San Diego, Calif., assignors to Science Applications, Inc., La Jolla, Calif.

Filed Dec. 31, 1974, Ser. No. 537,696

Int. Cl.² G01M 21/26

U.S. Cl. 250—343 **4 Claims**



1. A method for remotely monitoring the concentration of a particular gas species in a gaseous mixture which comprises passing the radiation from a distant source comprising the gaseous mixture through a sensor which comprises a detector, two forward and one aft chopper, a lens, specifying gas cells containing the gas species to be monitored and a reference cell containing a smaller amount of the particular gas; the first forward chopper alternately passing the entering radiation through the first cell pair comprising the gas cell containing the gas species being monitored and the reference cell, the aft chopper, operating at a higher frequency, providing an average of the radiation passing through both cells, whereby to generate a first signal at the detector; simultaneously passing the said radiation from the said distant source through the second forward chopper and the second cell pair comprising a specifying gas cell containing a different concentration of the gas species being monitored and the same reference cell aft while chopping it at a different frequency but using the same aft detector, and optical components to generate a second signal at the detector; the said ratio of the two signals being dependent only on the known transmissivities of the gas concentrations in the sensors and the transmissivity of the gas to be detected.

3,976,885

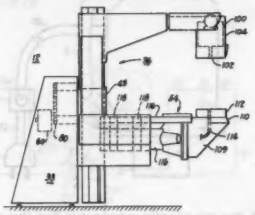
TOMOGRAPHY SYSTEM HAVING NONCONCURRENT, COMPOUND AXIAL SCANNING

Carl J. Brunnett, Mayfield Heights, Ohio; Jerome R. Cox, Jr., St. Louis; Donald L. Snyder, Clayton, both of Mo., and Rodney A. Mattson, Mentor, Ohio, assignors to Picker Corporation, Cleveland, Ohio

Filed Mar. 18, 1975, Ser. No. 559,411

Int. Cl.² G01N *25/00*

U.S. Cl. 250—445 T **16 Claims**



1. Apparatus for repetitiously scanning an interior section of a body with a beam of radiation which passes through substantially uniformly spaced coplanar points $[t(k), \theta(n)]$, the points being spaced about an origin in a plane containing the section comprising:

a. rotatable support structure providing a source axis transverse to said plane, the source axis being orbital around an area in the plane including said origin;

b. radiation source means rotatably coupled to said support structure for rotation around said source axis, the source means being orbital with the source axis and positioned to transmit a beam of radiation through a body having a section under investigation in said plane, said beam being of relatively small cross-sectional area compared to the body;

c. radiation detector means connected to the support structure and disposed for receiving said beam after it passes through a body under investigation;

d. control means coupled to said support means for effecting successive orbits of said source means around said area and for establishing and maintaining said radiation source means at each of a series of different predetermined angles of rotation about said source axis during successive orbits; and,

e. data collection means, including said radiation detector means, for measuring intensity values of said beam at angles ϕ, γ respectively about said source axis and about said origin characterized substantially as

$$\phi = \sin^{-1}\left(\frac{k\,\Delta\,t}{d}\right)$$

and $\gamma = \phi + n\,\Delta\,\theta$ where d represents the distance between the source and system axis, and k and n are integers.

3,976,886

APPARATUS FOR EFFECTING A SIMULTANEOUS MULTIPLE TOMOGRAPHY

Pierre Landau, 62 bis, Rue de la Tour, 75016 Paris, France

Filed Nov. 6, 1975, Ser. No. 629,675

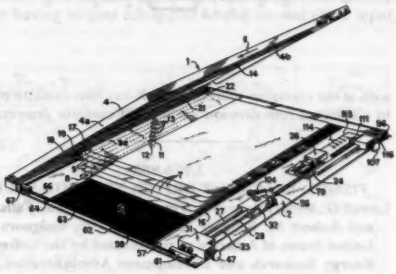
Claims priority, application France, Nov. 18, 1974, 74.37876

Int. Cl.² G03B *41/16*

U.S. Cl. 250—445 T **23 Claims**

1. In a simultaneous multiple tomography apparatus comprising a cassette adapted to be inserted in a case having a anti-diffusion grid, or Potter, of a table of a radiologic unit, and, disposed inside the cassette, a stack of thin assemblies of films and reinforcing screens, a lever pivotable relative to the cassette, each film-screens assembly having connected thereto a support, the pivotal lever being pivoted to the supports to interconnect the supports, the lever being capable of effecting, under the effect of a rectilinear travel of the Potter which is synchronized with a sweep travel of a radiogenic source of the radiolic unit, an angular movement under the effect of which movement the film-screens assemblies undergo relative rectilinear travels proportional to the travel of the Potter relative to the table; the improvement comprising:

a driving device connected to one of the supports, termed a pilot-support, and capable of imparting thereto a rectilinear travel at constant speed between an initial position



and a final position of the pilot-support in an operative travel of the film-screens assemblies in operation of the apparatus;

a locking device having an inoperative position and an operative position in which operative position it is capable of retaining the pilot-support in said initial position;

an actuating device controllable by the movement of the radiogenic source and cooperative with the locking device under such conditions that, at the moment when X-rays are emitted during the tomographic sweep travel, the locking device is rendered inoperative and the pilot-support is released whereby under the effect of the driving device the film-screens assemblies effect the required relative differential travels.

3,976,887

X-RAY EXAMINATION APPARATUS

Gunter Holzermer, and Gunter Schmitt, both of Erlangen, Germany, assignors to Siemens Aktiengesellschaft, Erlangen, Germany

Filed Mar. 27, 1975, Ser. No. 562,455

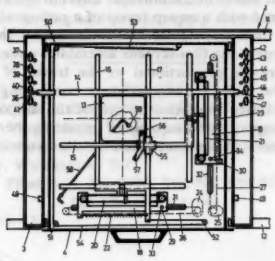
Claims priority, application Germany, Apr. 11, 1974, 2417891

Int. Cl.² G03B *41/16*

U.S. Cl. 250—468 **6 Claims**

1. In an X-ray examination apparatus having an adjustable X-ray focusing diaphragm; an examination table with a patient's support platform; an X-ray cassette drawer carriage slidable directly below said patient's support platform in the longitudinal direction of said examination table; and a cassette drawer insertable into said cassette drawer carriage including two pairs of clamping jaws, each said pair having two mutually oppositely adjustable clamping jaws for the retention of X-ray film cassettes inserted into said cassette drawer, the improvement comprising: means for moving the pairs of clamping jaws while clampingly engaging said cassettes independently of the sliding of said carriage below said patient's platform; and

means for slidingly adjusting the pairs of clamping jaws in two directions of movement of the clamping jaws associated there-



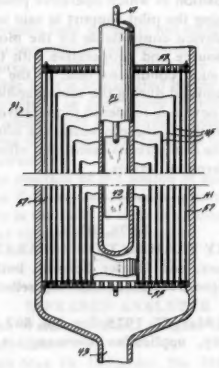
with at the clamping thereof of an X-ray film cassette pursuant to a selected film division within said cassette drawer.

3,976,888

FISSION FRAGMENT DRIVEN NEUTRON SOURCE

Lowell G. Miller; Robert C. Young, both of Idaho Falls, Idaho, and Robert M. Brugger, Columbia, Mo., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Jan. 23, 1975, Ser. No. 543,610
Int. Cl.² G21G *4/02*
U.S. Cl. 250—500 **10 Claims**



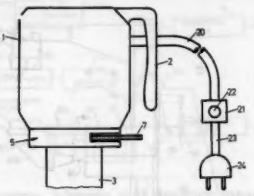
1. A method of producing approximately 14 MeV neutrons from fissionable material including U^{235} and a gas mixture including deuterium and tritium gas in about equal proportions by volume comprising: passing said gas mixture over and in contact with said fissionable material; exposing said fissionable material to a thermal neutron flux in order to fission a portion thereof resulting in energetic fission fragments which, in turn, transfer energy to said deuterium and tritium, producing approximately 14 MeV neutrons by the reactions $t(d,n)^4He$ and $d(t,n)^4He$.

3,976,889

X-RAY DIAGNOSTIC APPARATUS

Erich Noske, Erlangen, and Ulrich Grassme, Nurnberg, both of Germany, assignors to Siemens Aktiengesellschaft, Erlangen, Germany

Filed Aug. 23, 1974, Ser. No. 500,111
Claims priority, application Germany, Sept. 19, 1973, 2347178
Int. Cl.² G21K *3/50*
U.S. Cl. 250—510 **6 Claims**



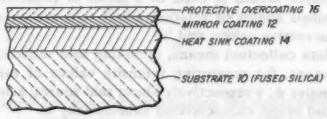
1. In an X-ray diagnostic apparatus for the preparation of dental X-ray exposures including means for fixedly setting values for the X-ray tube voltage and current, the improvement comprising: means for fixedly setting the exposure time; a plurality of filters for the X-radiation each coordinated with a particular exposure object in conformance with an exposure program in which the fixed values for said X-ray tube voltage, X-ray tube current and exposure time cannot be varied by a user of said diagnostic apparatus; and support means for said filters, said support means being adapted to selectively position a preselected one of said filters at any one time in the path of said X-radiation in conformance with a predetermined selected exposure object.

3,976,890

RADIATION DAMAGE RESISTANT MIRROR

William P. Barnes, Jr., and G. Richard Wirtenson, both of Acton, Mass., assignors to Itek Corporation, Lexington, Mass.

Filed Sept. 9, 1974, Ser. No. 504,603
Int. Cl.² G21K *3/00*
U.S. Cl. 250—510 **8 Claims**



1. A mirror structure designed to reflect radiation at wavelengths of interest while minimizing damage to the mirror surface caused by x-rays and comprising:

a. a glass substrate for the mirror, said glass substrate being substantially shaped to the desired configuration of the mirror, said glass substrate also having a relatively low coefficient of thermal conductivity such that it is a relatively poor conductor of heat;

b. a reflective coating on said glass substrate, said reflective coating having a high reflectivity at said wavelengths of interest, having a low atomic number so it is not susceptible to substantial x-ray damage, and having a relatively high coefficient of thermal conductivity compared to said glass substrate such that it is a good conductor of heat to said glass substrate; and

c. a heat sink coating between said reflective coating and said glass substrate, said heat sink coating having a relatively high coefficient of thermal conductivity compared to said glass substrate such that it is a good conductor of heat away from said reflective coating, and having a low

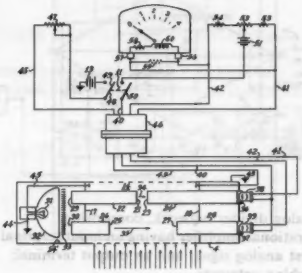
atomic number such that it is not subject to substantial x-ray damage.

3,976,891

PHOTOELECTRIC DETECTOR FOR SMOKE OR THE LIKE

Thomas F. Parkinson, Columbia, Mo., assignor to Electra-Tronics, Inc., Sarasota, Fla.

Filed Feb. 18, 1975, Ser. No. 550,626
Int. Cl.² G01N 21/26
U.S. Cl. 250—575 4 Claims



1. A detector responsive to smoke or the like particles present in a gas, comprising a chamber through which the gas to be tested may pass, a first pair of straight, axially aligned spaced light transmitting rods having respective confronting inner end faces within said chamber, a second pair of straight, axially aligned spaced light transmitting rods having respective confronting inner end faces within said chamber, each of said rod inner end faces being subject to gradual obfuscation by the accumulation thereon of dust or the like particles from said gas, each of said rods of each said pair having a respective outer end face at its end opposite its said inner end face and said outer end faces being disposed outwardly of said chamber, light producing means including means to pass light into one rod of each said pair through its said outer end face and through the respective said one rod and out through such inner end face thereof and thence through the gas between such face and into such other rod of the respective pair through the said confronting inner end face thereof, the distance between said confronting inner end faces of said first pair of rods being at least about twice the distance between said confronting inner end faces of said second pair of rods, each of said rod end faces being flat and perpendicular to the axis of its respective said rod, a respective photoelectric responsive means disposed adjacently opposite each said outer end face of each of said other rods for receiving the light transmitted along the respective said other rod from their said respective said inner confronting faces, and bridge circuit means for comparing the respective responses of said photoelectric responsive means.

3,976,892

PRE-CONDITIONING CIRCUITS FOR MOS INTEGRATED CIRCUITS

John K. Buchanan, Tempe, Ariz., assignor to Motorola, Inc., Chicago, Ill.

Division of Ser. No. 485,191, July 1, 1974, Pat. No. 3,942,162.
This application Feb. 7, 1975, Ser. No. 548,122
Int. Cl.² H03K 19/08, 19/20; G11C 17/00
U.S. Cl. 307—205 1 Claim

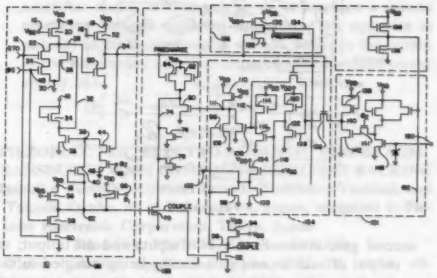
1. In an MOS micro-processor chip, a lookahead precharge circuit for an instruction decoder comprising:

a combinational logic gate including a first MOSFET connected between a first voltage conductor and a first node having a gate connected to a second voltage conductor,

a second MOSFET connected between said first node and a second node having its gate connected to an input adapted to have applied thereto a signal indicating the end of execution of a previous instruction, a third MOSFET connected between said second node and a ground conductor having its gate connected to a second clock input, a fourth MOSFET connected between said first node and said ground conductor;

an inverter including a fifth MOSFET connected between said first voltage conductor and a third node at which a precharge signal is generated and a sixth MOSFET connected between said third node and said ground conductor having its gate connected to said first node; and

a feedback circuit including a seventh MOSFET connected between a fourth node and a fifth node having its gate connected to said third node, an eighth MOSFET connected between said fourth node and said ground conductor having its gate connected to said second clock input,



a ninth MOSFET having its source connected to said fifth node and its gate and drain connected to a sixth node, a tenth MOSFET connected between said first voltage conductor and said sixth node having its gate connected to a first clock signal, an eleventh MOSFET connected between a seventh node and said sixth node and having its gate connected to said second clock conductor, a twelfth MOSFET connected between said first voltage conductor and said sixth node, and thirteenth MOSFET connected between said ground conductor and said seventh node and having its gate connected to said input, a fourteenth MOSFET connected between said first conductor and an eighth node having its gate and drain connected to said first voltage conductor, a fifteenth MOSFET connected between said eighth node and said ground conductor having its gate connected to said fifth node, and said eighth node being connected to the gate of said fourth MOSFET.

3,976,893

CIRCUIT FOR TESTING A LOGIC DELAY TIMER

Antonio Banfi, Milan, Italy, assignor to Societa Italiana Elettronica S.p.A., Milan, Italy

Filed Dec. 26, 1974, Ser. No. 536,489
Claims priority, application Italy, Feb. 20, 1974, 48495/74
Int. Cl.² H03K 19/08; G01R 15/12
U.S. Cl. 307—208 10 Claims

1. A check circuit for a delay timer which permits the performance of check operations during normal operation of the timer and without taking the timer out of service, said checking operations being for the purpose of determining timer calibration errors, loss in precision and "unsafe" breakdowns of the timer, as well as the check circuit, said check operation being performed without jeopardizing, by uncontrollable breakdowns, the safety of the required interventions performed by the timer, even during a check operation, said timer comprising an input and an output and means for creating a first output state, said input receiving a signal capable of assuming either a first input state or a second input state and normally disabled means for providing a signal of a first output

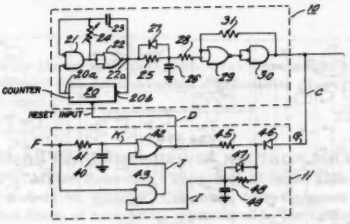
state when said input is at a first input state and for initiating a delay period when said input changes to said second input state and changing the output to a second output state upon completion of said delay period if said input remains at said second input state for a period longer than said delay period, said delay timer controlling an output utilization device having a known reaction time;

said check circuit having first and second inputs and an output;

said first input receiving either one of a check or a control signal;

said check circuit output being coupled to the input of said delay timer; said second input being coupled to the output of said delay timer;

first gate means having two inputs and an output, one of said inputs being coupled to said check circuit first input;



second gate means having two inputs and an output; the output of said second gate means being coupled to said check circuit output;

first delay means coupled between said check circuit first input and one input of said second gate means;

the output of said first gate means being coupled to the remaining input of said second gate means;

means connected to the check circuit output and the second input of said check circuit, for providing an enable signal to enable said first gate means whenever said timer input changes to its second state if said timer output is at its first state, and to terminate said enable signal whenever said timer output changes to its second state; and

second delay means, coupled between said means for enabling the first gate means and the second input of said first gate means, for delaying the turn-off transition of said enable signal for a predetermined time interval after said timer output has changed to its second state;

said first gate means providing a hold signal when said check circuit first input is at its first state and said logic means generates the enable signal;

said second gate means providing an output signal either after said check circuit first input has changed to its second state or if said first gate means provides said hold signal, providing the second state to said check circuit output and to make said timer count said delay period, even if said check circuit first input changes again to its first state before the end of said counting;

said first delay means providing a first state to the check circuit output by temporarily disabling said first and second gate means, whenever said check circuit first input changes to its second state, so that said timer must reset the counting of said delay period in any case, since another check or control signal is received at said check circuit first input;

said second delay means, when said predetermined time interval is less than the reaction time of the utilization device, giving the capability of providing a signal at said timer output useful for checking the timer without causing operation of the utilization device, when a check signal shorter than the delay period of the timer has been applied to said check circuit first output.

3,976,894

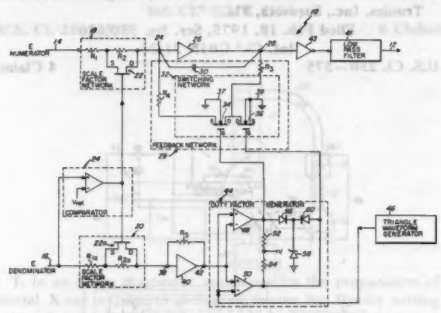
ANALOG DIVIDER CIRCUITRY

John F. Perkins, Jr., Bedford, and Ilmars Leja, Dracut, both of Mass., assignors to Raytheon Company, Lexington, Mass.

Filed Feb. 3, 1975, Ser. No. 546,374

Int. Cl.² G06G 7/12, 7/16

U.S. Cl. 307—229 **3 Claims**



1. An analog divider network, comprising:

a. an operational amplifier having an input terminal coupled to a first analog signal and an output terminal;

b. a switching network;

c. an electrical impedance serially coupled to the switching network, such electrical impedance and switching network being coupled between the input terminal and the output terminal;

d. means, including a triangular waveform generator, and a comparator network having one input coupled to the triangular waveform generator and a second input fed by the analog signal and an output coupled to the switching network for actuating the switching network to periodically decouple the electrical impedance from the input terminal and the output terminal for a time duration inversely proportional to the magnitude of a second analog signal;

e. a first variable electrical impedance means, coupled between the first analog signal and the input terminal of the operational amplifier, for changing the electrical impedance thereof in accordance with a control signal;

f. a second variable electrical impedance means, similar to the first variable electrical impedance means, coupled between the second analog signal and the comparator network, for changing the electrical impedance thereof in accordance with the control signal;

g. a reference voltage source; and

h. means coupled to the reference voltage source and responsive to the second analog signal, for producing the control signal in accordance with the difference between the second analog signal and the reference voltage.

3,976,895

LOW POWER DETECTOR CIRCUIT

James Teh-Zen Koo, Sunnyvale, Calif., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Mar. 18, 1975, Ser. No. 559,543

Int. Cl.² H03K 5/18, 5/20, 3/286, 3/353

U.S. Cl. 307—235 F **8 Claims**

1. A detector circuit comprising:

first, second, third, fourth, fifth and sixth switching devices, each device having a control terminal and first and second terminals;

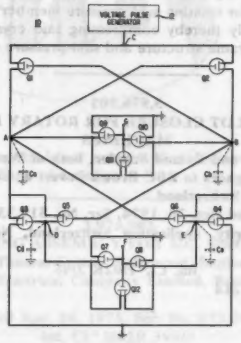
the first terminals of the first and second devices being coupled together and being adapted to be coupled to pulse supply means;

the second terminals of the first and second devices being adapted to serve as input/output terminals and being

coupled to the first terminals of the third and fourth devices, respectively;

the control terminal of the first device being coupled to the second terminal of the second device and the control terminal of the second device being coupled to the second terminal of the first device;

the second terminals of the third and fourth switching devices being adapted to be coupled to first power supply means;



the first, second and control terminals of the fifth device being coupled to the first terminal of the third device, the control terminal of the third device, and the first terminal of the fourth device, respectively; and

the first, second and control terminals of the sixth device being coupled to the first terminal of the fourth device, the control terminal of the fourth device, and the first terminal of the third device, respectively.

3,976,896

REFERENCE VOLTAGE SOURCES

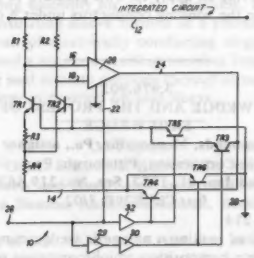
Alan Ryder, Church Crookham, near Aldershot, England, assignor to The Solartron Electronic Group Limited, Farnborough, England

Filed Oct. 28, 1975, Ser. No. 626,143

Claims priority, application United Kingdom, Oct. 29, 1974, 46868/74

Int. Cl.² H03K *1/12*

U.S. Cl. 307—297 **9 Claims**



1. A bipolar reference voltage source comprising:

a pair of ratio-matched transistors arranged to pass respective currents having different predetermined current densities at the respective emitters of the transistors, the emitter of one of the transistors being connected to two emitter resistances in series and the emitter of the other transistor being connected to the junction between the emitter resistances;

first and second power supply lines, the collectors of the transistors being coupled to said first power supply line by respective load means;

high-gain differential amplifier means having first and second inputs connected to respective ones of the collectors of the transistors, and an output connected to adjust the currents passed by the transistors to maintain the respective voltages at their collectors substantially equal; and

switching means having a first state in which the output of the differential amplifier means is coupled to the bases of the transistors, and the second power supply line is coupled to the end of the two emitter resistances remote from the emitter of said one transistor so as to produce a first reference voltage of one polarity between the output of the differential amplifier means and the second power supply line, the switching means having a second state in which the output of the differential amplifier means is coupled to said end of the two emitter resistances, the second power supply line is coupled to the bases of the transistors and the polarity of the gain of the differential amplifier means is changed, so as to produce a second reference voltage, equal in magnitude but opposite in polarity to the first reference voltage, between the output of the differential amplifier means and the second power supply line.

3,976,897

PIEZOELECTRIC ELECTRO-ACOUSTIC DIAPHRAGM TRANSDUCER WITH COMPOSITE RESILIENT BACKING

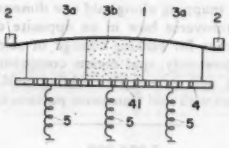
Masahiko Tamura; Kiyonori Iwama; Toshikazu Yoshimi, and Takashi Oyaba, all of Tokorozawa, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed Feb. 12, 1975, Ser. No. 549,339

Claims priority, application Japan, Feb. 18, 1974, 49-19523[U]; Feb. 18, 1974, 49-19524[U]

Int. Cl.² H01L *41/08*

U.S. Cl. 310—8.2 **16 Claims**



1. In a piezoelectric electro-acoustic transducer including a diaphragm of flexible piezoelectric material and a resilient backing element pressed against and resiliently backing and shaping the vibratory surface of said diaphragm, the improvement comprised in that said resilient element incorporates a plurality of different resilient members of which one differs from another in at least one physical characteristic thereof for imparting different operating characteristics to the transducer.

3,976,898

PRESTRESSED GLASS, AEZOELECTRIC ELECTRICAL POWER SOURCE

Melvin M. Newson, Albuquerque, N. Mex., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

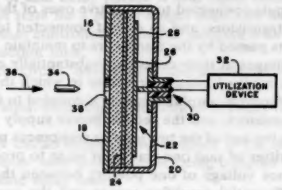
Filed Mar. 20, 1975, Ser. No. 560,427

Int. Cl.² H01L *41/04*

U.S. Cl. 310—8.3 **6 Claims**

1. A power source comprising the combination of a body of prestressed glass which explosively disintegrates upon damaging of a surface thereof; a piezoelectric transducer supported

directly on a face of said body consisting essentially of a piezoelectric element for substantially instantaneous shock activation thereof throughout interfaces of said element and pre-



stressed glass body, and a pair of thin electrodes disposed on opposite surfaces of said element; and means for coupling electrical energy from said electrodes to an actuable device.

3,976,899

SNAP ACTION MECHANICAL-ELECTRICAL PIEZOELECTRIC TRANSDUCER

David Geoffrey James Fanshawe, Redhill, England, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 422,671, Dec. 7, 1973, abandoned. This application Dec. 23, 1974, Ser. No. 535,995

Claims priority, application United Kingdom, Jan. 4, 1973, 563/73

Int. Cl.² H01L 41/04

U.S. Cl. 310—8.3 6 Claims

1. A mechanical-electrical transducer comprising a monostable snap action spring formed from a sheet of material of the type which snaps from a first shape to a second shape along one dimension upon application of at least a given force to the spring, and a piezoelectric element; in the absence of force applied to the spring, a portion of the spring extending transverse to said one dimension being bowed transverse to said dimension, said bow being substantially constant upon application of force less than said given force to the spring; upon said spring snapping along said one dimension, said bow changing to a transverse bow in an opposite direction; and piezoelectric means for sensing change of said direction of said transverse bow only, said means comprising said piezoelectric element and means for holding said piezoelectric element in contact with said transverse portion of said spring.

3,976,900

GAS IGNITION DEVICES

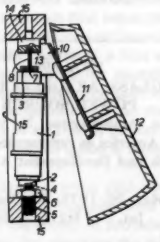
Ronald Arthur Harrison, Fareham, England, assignor to Plessey Handel und Investments A.G., Zug, Switzerland

Filed Jan. 23, 1975, Ser. No. 543,313

Claims priority, application United Kingdom, Jan. 30, 1974, 4262/74

Int. Cl.² H01V 7/00

U.S. Cl. 310—8.7 1 Claim



1. A piezo-electric spark generating device comprising, in combination, a rigid frame structure having a recess, a piezoelectric crystal assembly pivotally mounted at one end on said frame structure, the other end of said crystal assembly being provided with a recess adjacent said frame structure recess, a generally rectangular, substantially flat pressure member having upper and lower edges and a projection on each of said upper and lower edges, said pressure member being disposed between said crystal assembly and said frame structure with said projections on said upper and lower edges in engagement with said frame structure recess and said crystal assembly recess respectively and lever means connected to said pressure member for rotating said pressure member to pivot said crystal assembly thereby compressing said crystal assembly between said frame structure and said pressure member.

3,976,901

WINDING SLOT CLOSURE FOR ROTARY ELECTRIC MACHINES

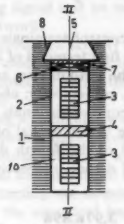
Gabor Liptak, and Roland Schuler, both of Wettingen, Switzerland, assignors to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed Oct. 30, 1974, Ser. No. 519,337

Claims priority, application Switzerland, Nov. 5, 1973, 15441/73

Int. Cl.² H02K 3/48

U.S. Cl. 310—214 4 Claims



1. In a rotary electrical machine comprising a laminated stack of iron sheets in which slots are provided and in which the winding conductors are inserted and the entrance to the slots are then closed by insertion of slot keys along complementary configured surfaces of the slots, the improvement wherein a row of individually acting disc springs made from an electrically insulative material are inserted in each slot between said slot key and the winding conductors, each of said disc springs serving to apply its own pressure to the slot key and to maintain the winding conductors under a compressive force.

3,976,902

MAGNETIC WEDGE AND THE PROCESS OF MAKING SAID WEDGE

Leonard B. Simmonds, Monroeville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Jan. 21, 1972, Ser. No. 219,663

Int. Cl.² B29D 3/02

U.S. Cl. 310—214 23 Claims

1. A method of making a magnetic wedge comprising:

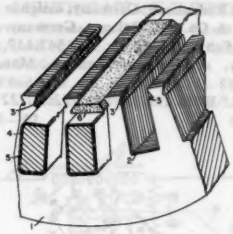
A. preparing a composition which comprises magnetizable particles and a thermosetting resin system having a viscosity of less than about 300 cps;

B. placing said composition in a mold;

C. vibrating said mold at least until air bubbles are no longer evolved from said composition to settle said magnetizable particles substantially into the lower portion of said mold, leaving the upper portion with substantially fewer magnetizable particles than the lower portion;

D. curing said composition;

E. removing the upper portion of said cured composition; and



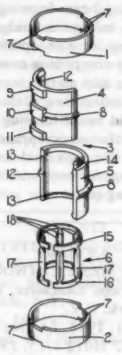
F. fabricating the lower portion of said cured composition into the shape of a wedge.

3,976,903

SLIP RING ASSEMBLY FOR A.C. MACHINES

Herbert John Thomas Cotton, Hollywood, England, assignor to The Lucas Electrical Company Limited, Birmingham, England

Filed Apr. 30, 1975, Ser. No. 573,261
Int. Cl.² H01R *39/08*
U.S. Cl. 310—232 7 Claims



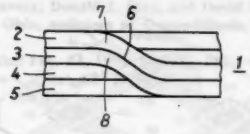
1. A slip ring assembly for an a.c. machine, comprising an electrically insulating sleeve formed of a plurality of arcuate portions, a pair of electrically conducting rings mounted on said sleeve, and a separate resilient member internally of said sleeve urging said arcuate portions thereof outwardly so as to retain said rings in position on said sleeve.

3,976,904

TRANSPOSED BAR FOR ELECTRIC MACHINES

Werner Leistner, and Josef Sergl, both of Berlin, Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Continuation of Ser. No. 424,756, Dec. 14, 1973, which is a continuation of Ser. No. 224,466, Feb. 8, 1972. This application Feb. 21, 1975, Ser. No. 551,701
Claims priority, application Germany, Feb. 12, 1971, 2108914
Int. Cl.² H02K *3/14*
U.S. Cl. 310—213 1 Claim

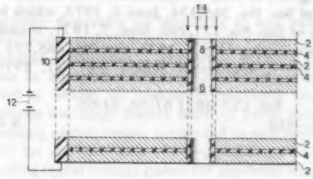
1. In a transposed bar for electric machines formed of mutually insulated partial conductors disposed in four adjacent layers and twisted by offsetting from one layer to another of the partial conductors traversing various elevations of the partial conductors in the adjacent layers, the improvement therein that respective partial conductors of two pairs of partial conductors, each pair located in an outer one of the layers, are located mutually adjacent one another at the same elevation and are jointly offset together in parallel contiguous

relation in the same direction at each offset location, respectively, the four layer bar having a closed rectangular profile between the offset locations thereof, and all partial conductors in said bar having a position which is changed during successive offsets until the partial conductors return to their original position.

3,976,905

CHANNEL ELECTRON MULTIPLIERS

Ady Seidman, Tel Aviv; Zohar Avrahami, Ramat Gan; Benjamin Sheinfux, Tel Aviv, and Jan Grinberg, Holon, all of Israel, assignors to Ramot University for Applied Research and Industrial Development Ltd., Tel-Aviv, Israel

Filed June 17, 1974, Ser. No. 480,683
Claims priority, application Israel, July 5, 1973, 42668
Int. Cl.² H01J *43/06, 43/10*
U.S. Cl. 313—103 CM 11 Claims



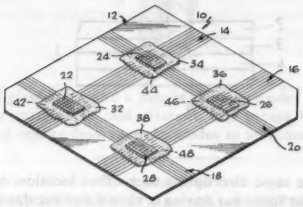
1. A channel electron multiplier including a plurality of layers of low-resistive material each alternating with a layer of high-resistive material; a tubular wall defined by an opening extending through the plurality of layers so as to form a plurality of axially-extending rings constituted by the edges of the opening through the layers, and a secondaryemission coating thereover; the low-resistive layers being each of a thickness many times large than that of the high-resistive layers, the diameter of the tubular wall being many times larger than the thickness of the high-resistive layers; said secondary-emission coating being in contact with the edges of the low-resistive and high-resistive layers defining said opening, and bring of a resistive material capable of emitting secondary electrons when struck by an incident electron or other charged particle or radiation; and means for applying a stepped electric voltage gradient to said plurality of low-resistive rings to thereby produce an electric field within the tubular wall which electric field has a radial component for accelerating the electron or other charged particle and for causing it to strike the resistive coating and to produce electrons by secondary emission.

3,976,906

PROGRAMMABLE CHARACTER DISPLAY MODULE

Ronald Corroalles Shattuck, Canoga Park, Calif., assignor to Litton Systems, Inc., Beverly Hills, Calif.

Filed June 9, 1975, Ser. No. 585,204
Int. Cl.² H01J 29/46
U.S. Cl. 313—500 17 Claims



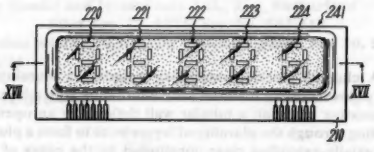
1. A programmable character display module comprising:
a. a flexible substrate,
b. a plurality of electrical conductor means on said substrate,
c. character display means on said substrate electrically connected to selected ones of said conductor means, and
d. an inflexible means encapsulating both said character display means and an adjoining portion of said substrate thereby converting said adjoining portion inflexible.

3,976,907

GAS DISCHARGE DISPLAY TUBE WITH BARRIER MEANS FOR PREVENTION OF ION SCATTERING

Yuzuru Yanagisawa, Fujisawa; Akio Ohgoshi, Tokyo; Akira Yamanaka, Fuchu, and Shoichi Muramoto, Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Division of Ser. No. 365,334, June 4, 1973, which is a continuation of Ser. No. 177,990, Sept. 7, 1971, abandoned.
This application May 1, 1974, Ser. No. 465,753
Claims priority, application Japan, Sept. 11, 1970, 45-80378
Int. Cl.² H01J 61/30, 61/66
U.S. Cl. 313—519 6 Claims



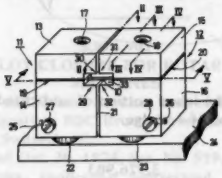
1. An indicator display tube comprising:
a plurality of indicator units formed on a plate of an insulating material, each of said plurality of indicator units consisting of a plurality of first electrode segments and at least one second electrode corresponding to said first electrode segments;
a transparent cover to form an envelope with said indicator units enclosed therein;
an ionizable gas sealed in said envelope; and
barrier means formed on the inner surface of said cover for preventing scattering of ionized ions when said gas is ionized and to prevent erroneous displays by said indicator units wherein said barrier means comprises a roughened surface formed on the inner surface of said cover.

3,976,908

ELECTRON BEAM GENERATOR WITH LINEAR CATHODE

Karl Georg Redel, Rodenbach, Germany, assignor to Leybold-Heraeus GmbH & Co. KG, Cologne, Germany

Filed Feb. 5, 1975, Ser. No. 547,117
Claims priority, application Germany, Mar. 2, 1974, 2410050
Int. Cl.² H01J 1/02, 1/44, 1/52, 21/22
U.S. Cl. 313—146 7 Claims



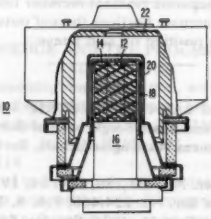
1. An arrangement in an electron beam generator comprising, in combination, a directly heatable linear cathode; metal clamps for clamping said cathode at at least one end so that said cathode is movable longitudinally; a beam-forming electrode at substantially the same potential as said cathode; connection means on said beam-forming electrode and supplying beam and heater voltage to said cathode; said beam-forming electrode having an exit opening for the electron beam, said metal clamps comprising connection contacts for the ends of said cathode, said metal clamps being outside the contact points in the emission area of the cathode and having recesses for forming said beam-forming electrode with said exit opening, said metal clamps comprising electrical contacts for conducting current through said cathode to heat said cathode, said metal clamps for both ends of said cathode being separated by an insulating plane.

3,976,909

WIRE MESH CATHODE

Joseph Richard Tomcavage, Lancaster, Pa., assignor to RCA Corporation, New York, N.Y.

Filed July 11, 1975, Ser. No. 595,287
Int. Cl.² H01J 1/15, 19/08
U.S. Cl. 313—341 10 Claims



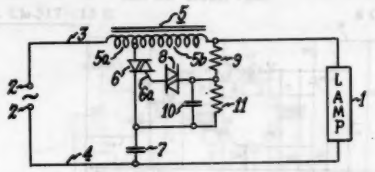
1. A wire mesh cathode comprising a first cylindrical array of spaced spiralling wires; and a second cylindrical array of spaced spiralling wires in angular contact with the first array, the first array having a fewer number of wires than the second array, the wires in both arrays being made of thoriated tungsten.

3,976,910

OPERATING CIRCUIT FOR DISCHARGE LAMPS WITH VOLTAGE STARTING CIRCUIT AND AUXILIARY LIGHTING MEANS THEREFOR

Michael Owens, Hendersonville, and David W. Knoble, East Flat Rock, both of N.C., assignors to General Electric Company, New York, N.Y.

Filed Mar. 17, 1975, Ser. No. 558,947
Int. Cl.² H05B 37/04, 41/14
U.S. Cl. 315—92 11 Claims



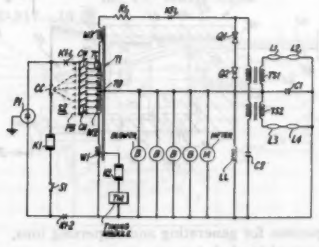
2. A starting and operating circuit for gaseous discharge lamps comprising, in combination, a source of alternating current, induction coil means connected at its input side to said alternating current source, discharge lamp means connected at one side to the output side of said induction coil means and at the other side to said alternating current source, high voltage starting means including a portion of said induction coil means for providing a high voltage starting pulse on said discharge lamp means, said high voltage starting means comprising a charging capacitor and controlled switch means in series with each other electrically connected to said induction coil means across said alternating current source, and an actuating circuit connected to said controlled switch means for controlling the operating of the same, said actuating circuit being connected to the junction of said induction coil means and said discharge lamp means, said induction coil means having a plurality of turns and a tap dividing the same into coil portions, said controlled switch means connected at one side to said tap and its other side to said charging capacitor.

3,976,911

ILLUMINATION SYSTEM AND METHOD AND MEANS FOR OPERATING IT

Maksymilian Michalski, Manhasset, N.Y., assignor to Berkey Photo, Inc., Woodside, N.Y.

Filed Sept. 10, 1973, Ser. No. 396,107
Int. Cl.² H05B 39/00
U.S. Cl. 315—101 22 Claims



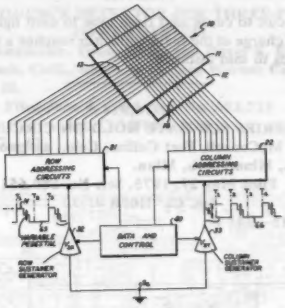
1. A drive system for a gas discharge lamp, comprising input means connectible to an alternating power source, voltage varying means connected to said input means and having an output for continuously establishing an alternating voltage, circuit means connecting the alternating output of the voltage varying means directly across the lamp, control means in said voltage varying means for setting the alternating voltage at the output of said voltage varying means within a range which includes a condition that causes the discharge lamp to arc and exhibit a positive impedance value when the lamp is discharging, said input means and said voltage varying means as well as said circuit means together with the source means exhibiting an impedance less than the positive impedance value of the discharge lamp when the lamp is discharging.

3,976,912

ELECTRICAL SUPPLY SYSTEM AND METHOD FOR IMPROVING THE OPERATING CHARACTERISTICS OF GASEOUS DISCHARGE DISPLAY PANELS

Joseph L. Miavecz; Donald J. Spry, and David S. Wojcik, all of Toledo, Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed Feb. 23, 1972, Ser. No. 228,543
Int. Cl.² H05B 37/00
U.S. Cl. 315—169 TV 10 Claims



1. In a gaseous discharge display panel having row-column conductor arrays nonconductively coupled to a gas discharge medium in a thin chamber space between said row and said column conductor arrays, improvement in the means supplying sustaining and write/erase voltage to said panel comprising,

a sustainer generator for supplying to said panel a pair of contiguous square wave sustainer voltages, one of said voltages constituting a write/erase pedestal voltage,

means to adjust the write/erase voltage pedestal voltage level to obtain the maximum operating range for said gaseous discharge display memory panel and,

addressing circuit means connected to said sustainer generator for applying data entering discharge condition controlling signal voltage pulses for algebraic addition to said write/erase voltage pedestals.

3,976,913

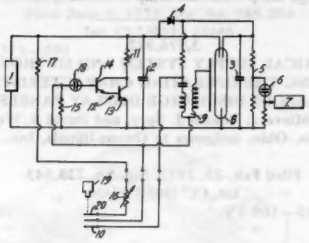
AUTOMATIC FLASH DEVICE

Yukio Mashimo, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 271,516, July 13, 1972, abandoned.
This application Mar. 11, 1974, Ser. No. 450,213
Claims priority, application Japan, July 15, 1971, 46-52540
Int. Cl.² H05B 37/00
U.S. Cl. 315—241 P 24 Claims

1. An automatic flash device responsive to photographic information comprising a power source, a main capacitor chargeable to a predetermined value by said power source, a discharge circuit connected to said main capacitor, a control circuit including variable resistance means coupled to said discharge circuit for controlling the amount of electricity discharged by said discharge circuit in response to distance to the object being photographed and producing a signal when the amount of electricity corresponding to said distance is discharged, a synchronizing contact coupled to said discharge circuit to actuate the discharge circuit for starting the discharge of said main capacitor through said discharge circuit, a flash tube connected to said main capacitor, and trigger

means connected to said control circuit and flash tube to trigger said flash tube in response to said signal from the



control circuit to cause said flash tube to emit light when the amount of charge at the main capacitor reaches a value which corresponds to said distance.

3,976,914

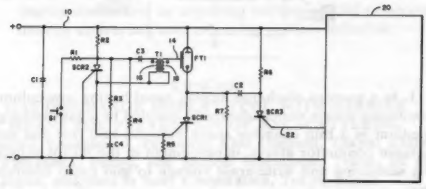
SERIES SCR GATE HOLD-ON CIRCUIT

Robert G. McConnell, Fort Collins, Colo., assignor to Honeywell Inc., Minneapolis, Minn.

Filed May 27, 1975, Ser. No. 580,651

Int. Cl.² H05B *41/32*

U.S. Cl. 315—241 P **8 Claims**



1. Electronic flash apparatus comprising:

flash tube means for producing a light flash in response to an ignition signal;

first switching means connected in series with the flash tube means, and first switching means having conductive and non-conductive states and having a control electrode for receiving a first signal to switch the first switching means from the non-conductive to the conductive state;

ignition signal means for producing the ignition signal, the ignition signal means comprising capacitor means and transformer means having a primary and a secondary, the secondary connected to the flash tube means;

an RC network for producing the first signal, the first signal having a duration greater than the time required by the flash tube means to produce a light flash in response to the ignition signal;

second switching means having first and second main current carrying electrodes and having a control electrode for receiving a second signal to switch the second switching means from a non-conductive to a conductive state, the first and second main current carrying electrodes being connected in a series circuit with the capacitor means and the primary, the first main current carrying electrode also being connected to the RC network, and the second main current carrying electrode also being connected to the control electrode of the first switching means; and

second signal means for producing the second signal, the second signal means comprising the capacitor means and contact means connected to provide, when closed, a current path between the capacitor means and the control electrode of the second switching means.

3,976,915

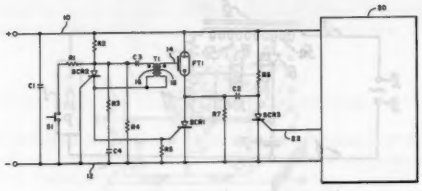
GATE PROTECTION CIRCUIT FOR ELECTRONIC FLASH APPARATUS

Robert G. McConnell, Fort Collins, Colo., assignor to Honeywell Inc., Minneapolis, Minn.

Filed May 27, 1975, Ser. No. 580,649

Int. Cl.² H05B *41/32*

U.S. Cl. 315—241 P **7 Claims**



1. In electronic flash apparatus including flash tube means for producing light; first switching means connected in series with the flash tube means, the first switching means having first and second main current carrying electrodes and a control electrode; and second switching means having first and second main current carrying electrodes and a control electrode, the second switching means for triggering the flash tube means and the first switching means; the improvement comprising:

the control electrode of the first switching means being directly connected to the second main current carrying electrode of the second switching means; and

the control electrode of the second switching means being directly connected to the second main current carrying electrode of the first switching means.

3,976,916

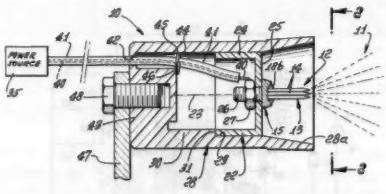
ANTISTATIC EQUIPMENT

Donald G. Saurenman, Whittier, Calif., assignor to Consan Pacific Incorporated, Whittier, Calif.

Filed Jan. 15, 1975, Ser. No. 541,262

Int. Cl.² H01T *19/04*

U.S. Cl. 317—4 **7 Claims**



1. In apparatus for generating and dispersing ions,

a. an electrical insulative carrier,

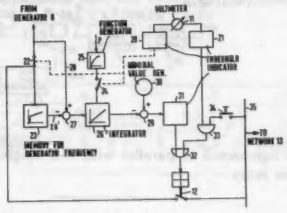
b. a cluster of parallel needles having adjacent shanks and forming multiple relatively closely spaced metallic tips extending in the same direction, said needles carried by said carrier, and

c. means electrically connected with said needles for supplying high voltage to said tips, said means including solder extending in the interstices formed by and between said shanks, and a metallic base supporting said solder and said shanks at the ends thereof opposite said tips.

3,976,917
PROTECTION DEVICE FOR A POWER PLANT TO PREVENT OVERLOADING IN THE EVENT OF SHORT CIRCUITS

Kurt Fork, Erlangen, Germany, assignor to Kraftwerk Union Aktiengesellschaft, Mulheim (Ruhr), Germany

Filed Mar. 12, 1975, Ser. No. 557,606
Claims priority, application Germany, Mar. 29, 1974, 2415448
Int. Cl.² H02H 7/06
U.S. Cl. 317—13 R **4 Claims**



1. An overload protection device for a turboset including an alternating-current generator, a turbine for the drive thereof, and a network supplied from the generator when disconnecting any short circuit within the network, comprising:

memory means connected to the generator for storing a voltage vector corresponding to positive sequence components obtained therefrom prior to the occurrence of a fault in the network;

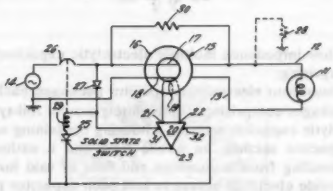
comparison means connected to said memory means and to the generator for comparison of the stored voltage vector with a voltage vector corresponding to the positive sequence components obtained from the generator following occurrence of said fault and for generating a difference value; and

switch means interconnected between the network and the generator for being released upon said difference value exceeding a predetermined value.

3,976,918
FALSE TRIGGERING PROTECTION FOR GROUND FAULT SENSOR

William R. Clark, Bedford, Mass., assignor to I-T-E Imperial Corporation, Spring House, Pa.

Filed Oct. 4, 1974, Ser. No. 512,211
Int. Cl.² H02H 3/28
U.S. Cl. 317—18 D **7 Claims**

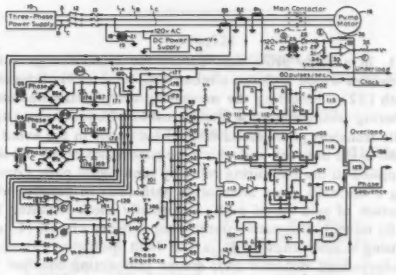


1. Circuit protective means including differential transformer means having first and second primary windings in series with the respective hot and neutral conductors connecting a load to an alternating current source of electrical energy and a secondary winding wherein signals related to differential currents in said primary windings are induced; circuit interrupting means in series with said hot conductor; solid state switching means connected to said interrupting means for actuating the latter to open said hot conductor; a polarity sensitive amplifier operative only when a current flows through said first primary winding toward said load, said polarity sensitive amplifier having an input to which said signals induced in said secondary winding are applied and having an output directly connected to said solid state switching means for controlling actuation of said interrupting means when said signals are of predetermined characteristics; and impedance means in electrical parallel connection across only said first primary winding to divert a portion of load current from flowing through only said first primary winding thereby to intentionally unbalance the current flow in said first and second primary windings in a direction to always desensitize said circuit protective means by the amount of current diverted by said impedance means at least during periods of high inrush currents to the load.

3,976,919
PHASE SEQUENCE DETECTOR FOR THREE-PHASE AC POWER SYSTEM

Joseph E. Vandevier, Tulsa, Okla., and David R. Ellis-Anwyl, Long Beach, Calif., assignors to Borg-Warner Corporation, Chicago, Ill.

Filed June 4, 1975, Ser. No. 583,719
Int. Cl.² H02H 3/26
U.S. Cl. 317—47 **5 Claims**



1. A phase sequence detector for monitoring the phase sequence of the three phase currents supplied by a three-phase AC power supply to a phase-sensitive three-phase load to determine if a predetermined desired phase sequence exists, thereby determining whether the power supply is correctly connected to the load, comprising:

a flip-flop having set and reset operating states and having first, second and third inputs for actuating said flip-flop to its two operating states, said flip-flop triggering to its set operating state in response to the application of an actuating signal to said second input at the same time that a certain signal condition is present on said first input and triggering to its reset state in response to the application of an actuating signal to said second input when a given signal condition is present on said third input;

means responsive to the three phase currents supplied to the three-phase load for providing first, second and third phase-displaced, control signals each of which is a function of and represents a respective one of the three phase currents;

means for applying said first, second and third control signals to said first, second and third inputs, respectively, said first and second control signals effecting actuation of said flip-flop to its set operating state when said predetermined desired phase sequence is present and said second and third control signals causing actuation of said flip-flop to its reset state if any other phase sequence exists;

and means responsive to and controlled by said flip-flop for providing an indication of the operating state of said flip-flop.

3,976,920

FILTERING ARRANGEMENT FOR RELAY PROTECTION DEVICES

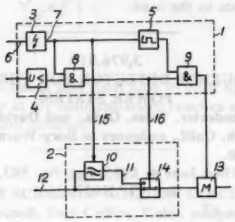
Leif Eriksson, and Lennart Thornell, both of Vasteras, Sweden, assignors to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, Sweden

Filed May 22, 1975, Ser. No. 580,461

Claims priority, application Sweden, June 20, 1974, 7408158

Int. Cl.² H02H 7/22

U.S. Cl. 317—49 3 Claims



1. In a relay protection device for electric high voltage networks which includes a measuring relay (13) and a signal path (12) connecting the measuring relay to the network, a filtering arrangement for filtering off low frequency and aperiodic transient phenomena which may occur in the event of a fault in the network and which are superimposed on the signal supplied to the measuring relay by such signal path, comprising a normally open alternative path (11) in parallel with a portion of said signal path, a normally short-circuited filter (10) in such alternative path, a supervisory circuit (1) comprising a time circuit (5), a fast fault indicator (3) and an undervoltage detector (4), means connecting the fast fault indicator and the undervoltage detector to the network, means (15) connected to the fast fault indicator to break the short-circuit of the filter, means (16) connected to the overvoltage detector and responsive to a signal therefrom to connect said alternative path in said signal path, and means (9) connected to the time circuit and to the undervoltage detector to block the measuring relay during a time interval which is equal to the difference between the pulse time of the time circuit and the time of operation of the undervoltage detector.

3,976,921

TRIGGERING CIRCUIT

Edward D. Pearlman, 1442 2nd Ave., Apt. B, Oakland, Calif. 94606

Filed Jan. 27, 1975, Ser. No. 544,634

Int. Cl.² H01H 47/00

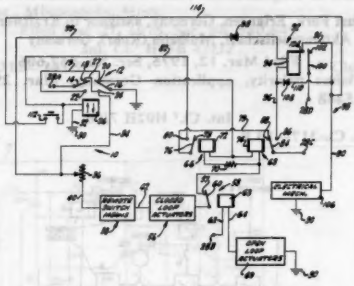
U.S. Cl. 317—135 R 9 Claims

1. Circuit for triggering an electrical signal for activating an electrically operated mechanism such as an alarm, actuator and the like, having a D.C. current source, comprising:

a. switch means for producing an electrical pulse connected in series with the D.C. current source,

b. means for reversing the direction of current flow in said circuit comprising a single-pole, single-throw relay, and a double-pole, double-throw pulse latching relay, both of said relays connected in series with said switch means and each other, such that current flow in one direction in said circuit signifies a closed circuit and current flow in the opposite direction in said circuit signifies that a circuit break will activate the mechanism, and

c. means for activating the mechanism upon a circuit break by the generation of an electrical signal comprising a single-pole, double-throw relay biased for greater current flow connected in parallel with said single-pole, single-throw relay.



3,976,922

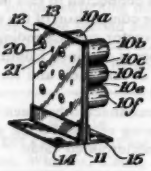
LOW IMPEDANCE MULTIPLE ELECTROLYTIC CAPACITOR ASSEMBLY

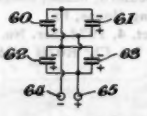
David B. Peck, and Edward C. Geissler, both of Williamstown, Mass., assignors to Sprague Electric Company, North Adams, Mass.

Filed June 27, 1975, Ser. No. 591,197

Int. Cl.² H01G 9/00

U.S. Cl. 317—231 10 Claims





1. A low impedance multiple electrolytic capacitor assembly comprising:

a. at least four electrolytic capacitor packages, each of said packages comprising a convolutely wound foil-type electrolytic capacitor section, a housing containing each said capacitor section, an anode lead and a cathode lead extending from a common end face of said housing to provide electrical access to said each capacitor package; and

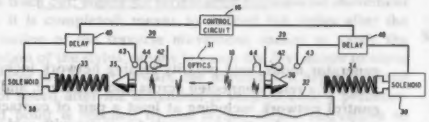
b. a stripline comprising an insulative layer, a first metal part and a second metal part being bonded to and covering major portions of the opposite surfaces of said insulating layer, respectively, said anode lead and said cathode lead of each of said capacitor packages extending through holes provided therefor in said stripline, each of said anode leads being connected to said first metal part and each of said cathode leads being connected to said second metal part, said end face of each of said capacitor pack-

ages being adjacent to said stripline, a portion of said stripline extending away from the region wherein said connections of said leads are formed, thereby providing electrical access to said multiple capacitor assembly.

3,976,923
PATTERN GENERATING APPARATUS

Victor Andrew Firtion, Secaucus; Leif Rongved, Summit, and Thomas Edward Saunders, Basking Ridge, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Division of Ser. No. 496,150, Aug. 9, 1974, Pat. No. 3,925,785.
This application Apr. 16, 1975, Ser. No. 568,522
Int. Cl.² H02K *33/14*
U.S. Cl. 318—128 7 Claims

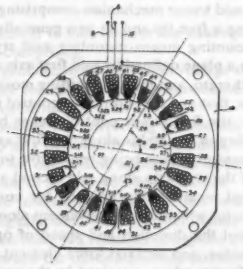


1. In combination:
a carriage;
apparatus for causing the carriage to reciprocate between first and second laterally spaced apart locations comprising a first spring located at the first location and a second spring located at the second location, the distance between the first and second springs being substantially in excess of the lateral extent of the carriage;
a bearing surface between the first and second locations;
the carriage being mounted on the bearing surface and being adapted to reciprocate between the first and second springs, the first and second springs being spaced apart sufficiently far to allow the carriage to move over a substantial portion of its reciprocating travel in a free-moving and low-friction way on the bearing surface with no direct contact with the first and second springs;
and means for imparting energy to at least one of the springs in synchronism with the reciprocation, thereby to maintain reciprocation uniformity.

3,976,924
SINGLE PHASE, TWO POLE A.C. RESISTANCE SPLIT-PHASE UNIDIRECTIONAL INDUCTION MOTOR

Chandu R. Vanjani, Dayton, Ohio, assignor to A.O. Smith Corporation, Milwaukee, Wis.

Filed Oct. 24, 1974, Ser. No. 517,525
Int. Cl.² H02P *1/44*
U.S. Cl. 318—220 R 1 Claim

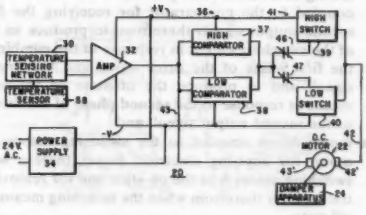


1. A single phase, two pole A.C. split-phase unidirectional induction motor of the resistance split-phase type comprising a source of single phase A.C. electrical power, a stator core assembly having a plurality of circumferentially spaced coil receiving slots communicating with a substantially cylindrical bore, a rotor assembly mounted within said cylindrical bore for selective rotation in a first direction, a single main winding having a plurality of coils located within less than all of said slots and spaced on opposite sides of said bore with empty stator slots therebetween to form a single pair of main winding electrical poles and a main field axis, a single starting winding having a plurality of coils located within less than all of said slots and correspondingly spaced on opposite sides of said bore with slots therebetween filled with said starting winding to form a single pair of starting winding electrical poles and a single starting field axis electrically spaced out of quadrature from said main field axis with a plurality of said starting winding coils spaced from a plurality of said main winding coils by less than ninety physical degrees in the first direction for providing a predetermined main winding current at a predetermined speed corresponding to a predetermined torque, and current responsive switch means connected to said source and to said main winding and sensing the main winding current and including means selectively connecting said source to said starting winding, said switch means operating to sense said predetermined main winding current to operate said connecting means to disconnect said starting winding form said power source at said predetermined speed for maintaining the heating of said starting winding within a predetermined temperature.

3,976,925
INTEGRAL MOTOR CONTROLLER

George Rudich, Jr., Goshen, Ind., assignor to Johnson Controls, Inc., Milwaukee, Wis.

Filed Mar. 25, 1975, Ser. No. 561,891
Int. Cl.² G05B *13/02*
U.S. Cl. 318—257 21 Claims



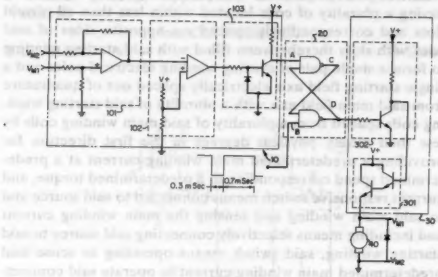
1. In a control system including a sensing device for monitoring a parameter of the system, a control circuit controlled by the sensing device to provide an output for controlling apparatus of the system to maintain the parameter at a predetermined set point value, said control circuit comprising first means controlled by said sensing device to provide an error signal which varies in amplitude and polarity from a reference value in accordance with changes in said parameter, and second means responsive to said error signal to effect the connection of a voltage of one polarity to a first output terminal of the control circuit whenever said error signal increases a predetermined amount relative to said reference value and to effect the connection of a voltage of the opposite polarity to said first output terminal whenever said error signal decreases a predetermined amount relative to said reference value, said error signal circuit whereby the amplitude of the potential difference between said first and second output terminals is proportional to the deviation of said error signal from the reference value and the polarity of the potential difference between said first and second output terminals is determined by the polarity of the error signal.

3,976,926

DIGITAL DC MOTOR SPEED CONTROL CIRCUIT

William E. Egbert, Sunnyvale, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Aug. 5, 1974, Ser. No. 494,670
Int. Cl.² H02P 7/06
U.S. Cl. 318—331 13 Claims



1. An electrical motor speed control circuit comprising:
an electrical motor having a characteristic back emf when coasting;
a comparator having a first input port coupled to the motor for continuously monitoring the armature voltage thereof and a second input port coupled to a reference voltage, said comparator producing a first output signal when the armature voltage is the characteristic back emf of the motor having a value less than the reference voltage and a second output signal when the armature voltage is greater than the reference voltage;
switching means having an on-state and an off-state, a first input port for receiving a drive signal, said drive signal having first and second phases, and a second input port coupled to the comparator for receiving the first and second output signals therefrom, to produce an on-state of the switching means in response to the combination of the first phase of the drive signal and the first output signal, and to produce the off-state of the switching means in response to the second phase of the drive signal or the second output signal; and
a motor driver coupled to the switching means and the motor for applying electrical power thereto when the switching means is in the on-state and for removing electrical power therefrom when the switching means is in the off-state.

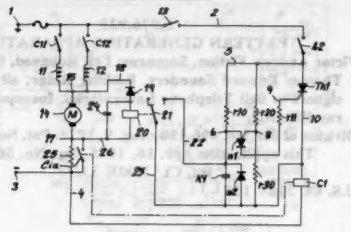
3,976,927

CIRCUIT FOR THE ENERGIZATION OF AN ELECTRIC MOTOR WITH TIME DELAY

Siegfried Puschel, Aschaffenberg, and Jan Turkowski, Obernburg, both of Germany, assignors to Linde Aktiengesellschaft, Wiesbaden, Germany

Filed Dec. 17, 1973, Ser. No. 425,614
Claims priority, application Germany, Dec. 22, 1972, 2263039
Int. Cl.² H02P 1/20
U.S. Cl. 318—421 8 Claims

1. In a system for controlling a direct-current electric motor having a time-delay circuit for applying an operating potential to said motor after the lapse of a predetermined period following energization of said circuit, an armature across which a potential of normal polarity is operable during normal drive of the motor and an opposite potential develops when the motor operates in a generator mode, and a direct-current source for energizing said motor, the improvement which comprises:
a polarity-sensing network connected across said armature for detecting the polarity of the potential developed thereacross; and
a control network electrically connected to said time-delay circuit for rendering same effective upon the detection by said polarity-sensing network of a potential across said armature representing operation of said motor in said



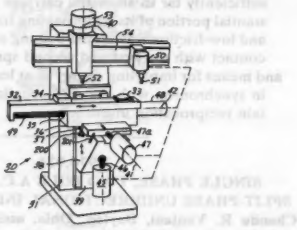
generator mode, said polarity-sensing network including a coil of a relay connected across said armature, and said control network including at least a pair of contacts of said relay, and a diode connected in series with said relay across said armature.

3,976,928

TRACER MECHANISM HAVING SERVO POSITIONING TYPE CONTROL MEANS ASSOCIATED WITH PLURAL MOTORS

Robert H. Wenzel, Orange, Calif., assignor to Textron, Inc., Providence, R.I.

Filed Mar. 26, 1974, Ser. No. 455,018
Int. Cl.² G05B 19/36; B23Q 5/28
U.S. Cl. 318—578 20 Claims



1. A tracer mechanism for controlling the application of power to motors that move machine tool elements whereby to cause movement of a workpiece relative to a cutting tool as the consequence of the tracing of a pattern by the tracer mechanism, said tracer mechanism comprising: a tracer body; a stylus having a free tip and an axis generally aligned with a first axis; mounting means mounting said stylus for pivotal movement in a plane defined by said first axis and by a second axis normal thereto, and for axial shifting movement along the said first axis; first and second power control means mounted to said body, the first power control means being responsive to axial shifting of the stylus along the first axis, and the second power control means being responsive to components of deflection of the stylus tip along said second axis, each of said power control means being adapted for connection with a respective motor which causes movement along the respective axis to control the direction and speed of operation of said respective motor; and an axial force element mounted to the body and effective when energized by the passage of an electrical current therethrough to exert an axial force on said stylus along said first axis.

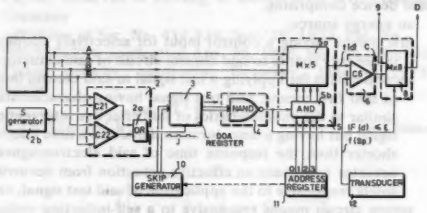
17. A system for tracing the surface of a pattern with the stylus of a tracer mechanism in a series of laterally spaced-

apart trace cuts, all of which trace cuts begin at the same edge of the pattern, said system comprising: a tracer mechanism according to claim 8 in which said axial force means can distend said tracer stylus, a first axis motor, a second axis motor, and a third axis motor adapted to move the pattern along respective mutually perpendicular axes, respective to like axes of the tracer mechanism; limit means for terminating operation of the second axis motor at the end of a trace cut; means for causing the first axis motor to retract the tracer mechanism away from the pattern along the first axis; means for terminating the retract movement when it is completed; pick feed means for causing the third motor to move the tracer mechanism laterally relative to said plane; means for terminating the pick feed movement when it is completed; means for causing the second motor to move the tracer mechanism in a traverse movement in a direction opposite from the direction of the trace cut; means for terminating the traverse movement when it is completed; means to distend the stylus after the termination of the traverse movement; means to verify the distention of the stylus; means to cause the first motor to move the tracer mechanism toward the pattern at a predetermined rate of speed after the distention is verified until a predetermined point is reached by the stylus; means responsive to arrival at said predetermined point to retract the distended stylus; means effective after said retraction to cause the first motor to move the tracer mechanism toward the pattern at another rate of speed suitable for metal cutting until a predetermined stylus position is achieved; and means responsive to the attainment of the said position for starting a new trace cut after said predetermined stylus position is achieved, all in the order recited.

3,976,929
DEVICE FOR THE EXACT POSITIONING OF A MOVABLE PART

Rene Jean Rodier, Bobigny, France, assignor to Compagnie Honeywell Bull (Societe Anonyme), Paris Cedex, France

Continuation-in-part of Ser. No. 345,814, March 28, 1973. This application July 16, 1974, Ser. No. 489,028
Int. Cl.² G05B 11/18
U.S. Cl. 318—594 **7 Claims**



1. An improvement in a device for the exact positioning of a movable part, comprising:

means for the generation of sinusoidal voltage signals whose zero passages represent different successive equispaced stop positions of the movable part;

servo circuit means for correcting movement of the part until its stop at a destination stop position;

control means for controlling application of said sinusoidal voltage signals to said servo circuit means;

pulse generator means receiving, on the one hand, said sinusoidal signals and, on the other hand, a threshold voltage whose value is a function of a given fraction of the distance between the destination stop position of the part and the previous stop position and generating a pulse whenever said sinusoidal voltage signals become equal to or smaller than said threshold voltage;

difference of address register means for storing the number of said stop positions between the destination stop position and the stop position actually attained, said difference of address register being responsive to said pulses to count down said number;

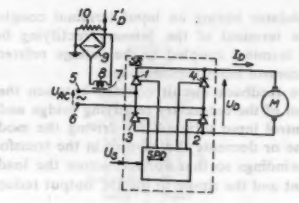
a circuit for control of the displacement of the part, said circuit receiving the output from said servo circuit means; and

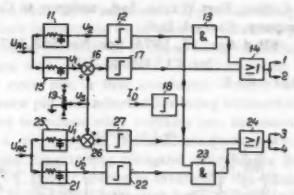
decodification circuit means for enabling said control means and said circuit for control of the displacement of the part when said difference of address register means signals zero as the number of stop positions between the destination stop position and the stop position actually attained.

3,976,930
CONTROLLED STATIC CONVERTOR FOR MOTOR CONTROL AND CONTROL ANGLE LIMITING ARRANGEMENT

Kjell Rehnman, Vasteras, Sweden, assignor to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, Sweden

Filed Mar. 27, 1975, Ser. No. 562,485
Claims priority, application Sweden, Apr. 5, 1974, 7404601
Int. Cl.² H02M 1/06
U.S. Cl. 321—5 **2 Claims**





1. Controlled static convertor having terminals (5,6) for connection to an alternating voltage source, comprising controlled rectifiers (1, 2, 3, 4) and a control pulse device (SPD) arranged to deliver control signals to the rectifiers, the control pulse device comprising means (15, 16, 17; 25, 26, 27; 19) for affecting the control angle (α) of the rectifiers and means (11, 12; 21, 22) for limiting the control angle to an upper limit value (α_{max}), the convertor comprising means (7, 8, 9, 10, 13, 18) responsive to a discontinuous direct current to render the control angle limiting means inactive.

3,976,931
AC REGULATOR

Kermit Karold Sterling, Plano, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

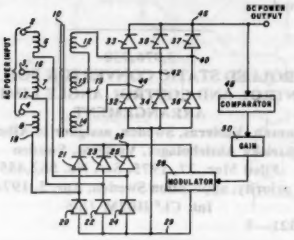
Filed Feb. 3, 1975, Ser. No. 546,248
Int. Cl.² H02M 7/217
U.S. Cl. 321—18 **5 Claims**

1. An AC regulator for controlling the current in primary windings of a multiphase transformer comprising:

a. a multiphase transformer having a plurality of primary and secondary Y connected windings:

b. a full wave rectifying bridge having an AC input coupled to one end of each transformer secondary winding, said bridge having a positive terminal and a negative terminal;

c. a full wave rectifying bridge having an AC input coupled to one end of each transformer primary winding, said bridge having a positive terminal and a negative terminal, the negative terminals of said primary and secondary rectifying bridges connected in common to form a voltage reference point;



d. a modulator having an input terminal coupled to the positive terminal of the primary rectifying bridge, an output terminal coupled to the voltage reference point and a control input terminal; and

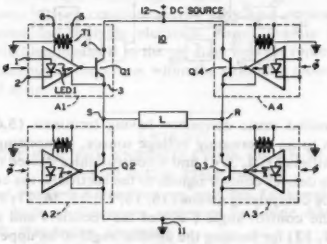
e. a drive feedback circuit coupled between the positive terminal of the secondary rectifying bridge and modulator control input terminal for driving the modulator to increase or decrease the current in the transformer primary windings so that voltage across the load remains constant and the ripple in the DC output reduced.

3,976,932

BRIDGE TRANSISTOR INVERTER CIRCUIT

James R. Collins, Fort Wayne, Ind., assignor to General Electric Company, Carmel, Ind.

Filed Apr. 15, 1975, Ser. No. 568,237
Int. Cl.² H02M 7/53
U.S. Cl. 321—45 R **12 Claims**



1. A bridge type switching transistor inverter circuit for driving high power AC loads from a DC electrical energy source, comprising:

first, second, third and fourth photocouple isolated switching amplifiers, including first, second, third and fourth load switching transistors respectively for controlling power to the load and arranged in the bridge configuration that the load may be connected between the junctions of the first and second transistors and the third and fourth transistors;

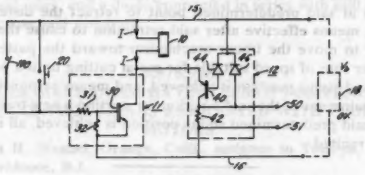
a driver circuit connected to the respective switching amplifiers by photocouple isolation means for providing necessary complementary drive logic and turn-on delays coordinated to the switching amplifier response time to control conduction of the photocouple isolated switching amplifiers for avoiding a simultaneous conduction period of the first and second switching transistors and the third and fourth switching transistors at the instant of inverter circuit reversal of load polarity.

3,976,933

METHOD AND CIRCUIT FOR IN-SERVICE TESTING OF AN ELECTRO-MAGNETICALLY ACTUATED COMPONENT

Antonio Banfi, Vimercate, Italy, assignor to Societa Italiana Elettronica S.p.A., Milan, Italy

Filed Dec. 20, 1974, Ser. No. 534,727
Claims priority, application Italy, Feb. 20, 1974, 48492/74
Int. Cl.² G01R 31/02
U.S. Cl. 324—28 R **7 Claims**



1. A device for checking the electromagnetic efficiency of an actuator having a control circuit and a known response time to a flow of current in said control circuit, the checking being performed while said actuator is installed and in-service in a system; said system having the capability to provide an effective intervention signal to said actuator control circuit even during the performance of the check on said actuator, said device comprising:

an energy source;

first means having a control input for selectively coupling the energy source to said control circuit of said actuator;

second means for applying a test signal to said control input of said first means, said test signal having characteristics similar to the characteristics of said effective intervention signal but having a time duration limited to a time interval shorter than the response time of said electromagnetic actuator to prevent an effective actuation from occurring solely responsive to the application of said test signal; and

return circuit means responsive to a self-induction voltage developed by the control circuit of said electromagnetic actuator when said first means decouples the energy source from said actuator, for discharging the energy stored in said control circuit; said return circuit means including third means for developing a pulse signal responsive to a current generated by said self-induction voltage to indicate the change in the electromagnetic state of said control circuit of said actuator to ascertain the efficiency of said actuator, said control circuit, and said first and second means;

each of said test and effective intervention signals being independently coupled to said control input to allow said effective control signal from said system to actuate said first means and said actuator even when said second means applies said test signal to said control input, whereby an effective intervention signal whenever received from said system will completely actuate said actuator even during the performance of the in-service check thereof.

3,976,934

METHOD AND APPARATUS FOR THE CONTINUOUS, CONTACTLESS TESTING OF A LONG CONDUCTOR WHICH CONSISTS AT LEAST PARTIALLY OF SUPERCONDUCTIVE MATERIAL

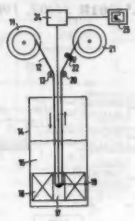
Hans Voigt, Erlangen-Kosbach, and Gunther Rupp, Nunberg, both of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed June 26, 1975, Ser. No. 590,678

Claims priority, application Germany, July 1, 1974, 2431505

Int. Cl.² G01R 33/12

U.S. Cl. 324—34 SC 10 Claims



1. A method for the continuous, contactless testing of a long conductor which consists at least partially of superconductive material comprising moving the conductor, with its superconductive material in the superconducting state, through an external magnetic field which induces shielding currents in the superconductor material, and measuring the magnetic field produced by said shielding currents.

3,976,935

APPARATUS FOR MEASURING THE INTERNAL FIELD INTENSITY OF MAGNET BODIES

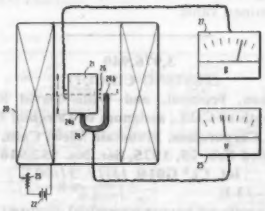
Erich Steingroever, Bonn, Germany, assignor to Elektro-Physik, Hans Nix & Dr.-Ing. E. Steingroever KG, Cologne, Germany

Division of Ser. No. 414,324, Nov. 29, 1973, Pat. No. 3,925,724. This application Apr. 30, 1975, Ser. No. 573,132

Claims priority, application Germany, June 6, 1973, 2328690

Int. Cl.² G01R 33/14

U.S. Cl. 324—34 R 6 Claims



1. In apparatus for measuring the internal field intensity H of a sample body of magnetic material having opposite pole surfaces extending in parallel planes by subjecting a sample body to a magnetic field of variable intensity having lines of force passing through said sample body in directions perpendicular to said parallel planes, the improvement which comprises an elongated magnetic potential measuring coil means having a non-magnetic core and a uniform winding area density along its length, one end of said measuring coil means being disposed in contact with one of the pole surfaces of said body, while being subjected to said magnetic field; the other end of the measuring coil means being disposed between said parallel planes of the opposite pole surface in a zone having a neutral magnetic potential with respect to the opposite pole surfaces of the sample body, and a fluxmeter connected with said coil means, said means for generating said magnetic field of variable intensity comprising an iron-free coil surrounding said sample body and said magnetic potential measuring coil means.

3,976,936

NON-DESTRUCTIVE METAL INSPECTION APPARATUS USING A SHARP-POINTED PIN AND COIL FOR PRODUCING EDDY CURRENTS IN THE INSPECTED ARTICLE

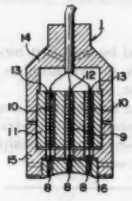
Eizo Nishino, Kitakyushu, Japan, assignor to Nihon Densokki Kabushiki Kaisha, Kitakyushu, Japan

Filed Sept. 11, 1974, Ser. No. 505,202

Claims priority, application Japan, Feb. 23, 1974, 49-21036; Feb. 28, 1974, 49-24072; June 27, 1974, 49-74911

Int. Cl.² G02R 33/12

U.S. Cl. 324—37 2 Claims



1. Eddy current flow inspection apparatus comprising an inspection core constituted by at least one thin core pin having a pointed end, a pluraltiy of exciting cores including respective thin pins with pointed ends circumferentially arranged around the core pin, a first conductor wound around the inspection core pin and adapted for being connected to a AC power source to induce eddy currents into the member to be inspected, a plurality of second conductors respectively wound around the exciting pins and adapted for being connected to a DC power source to magnetize the member to be inspected, a holder having through-holes therein in a number corresponding to that of said inspection and exciting core pins for holding said coils and cores within the holes to direct and confront said pointed ends at the member to be inspected with a slight clearance, and means connected to the first conductor to monitor changes in the eddy currents due to flaws.

3,976,937

METHOD AND APPARATUS FOR RECORDING POSITION OF SENSOR IN AIRBORNE MAGNETIC SURVEYING

Daniel P. Hearn, Richardson, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Apr. 16, 1973, Ser. No. 351,177

Int. Cl.² G01V 3/16; G01C 11/00

U.S. Cl. 324—4 1 Claim

1. A system for measuring magnetic fields from an airplane, comprising:

a first and a second bird;

a high drag cable and a low drag cable by means of which said first and second birds are towed respectively from said airplane so that said first bird is at a higher altitude than said second bird;

separate magnetometer sensing means carried respectively by said first and second birds for measuring at a predeter-

mined rate the magnetic fields at said first and second birds;

means for comparing the fields measured by said respective magnetometer sensing means;

camera means carried by said first bird to photograph the earth therebeneath in synchronism with the magnetic field measuring rate; and

means carried by said first bird upon which said camera is mounted for maintaining said camera at a constant downward orientation, whereby the position of said first bird can be accurately recorded.

3,976,938

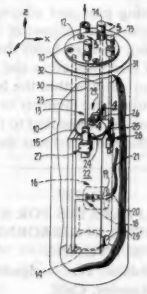
SUPERCONDUCTING MAGNETIC SENSOR WITH IMPROVED BALANCING SYSTEM

Victor W. Hesterman, Palo Alto, Calif., assignor to Superconducting Technology, Inc., Mountain View, Calif.

Filed Dec. 9, 1974, Ser. No. 530,625

Int. Cl.² G01R *33/02*

U.S. Cl. 324—43 R **19 Claims**



1. In a superconducting magnetic sensing device having at least one sensing coil in a superconducting environment for generating a signal representative of a local magnetic field and means for balancing said device to an initial state, the improvement wherein said balancing means comprises at least one superconducting member mounted closely adjacent a peripheral portion of said coil in said environment for trimming the magnetic field sensed by said coil, said superconducting member having a maximum longitudinal dimension substantially less than the diameter of said coil and a maximum thickness dimension substantially less than said maximum longitudinal dimension in order to provide substantial interactions only with that component of said magnetic field extending in a direction normal to said longitudinal dimension and parallel to said thickness dimension, and means for varying the position of said superconducting member relative to said coil, said position being limited to a region in the immediate vicinity of said coil.

3,976,939

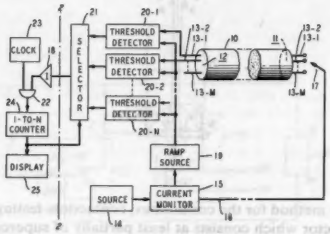
CONDUCTOR IDENTIFICATION IN MULTICONDUCTOR CABLES

Tommy Clay Cruce, and Ernest Joseph Woodall, both of Burlington, N.C., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 3, 1975, Ser. No. 583,162

Int. Cl.² G01R *31/02, 19/16*

U.S. Cl. 324—66 **9 Claims**



1. In a system comprising a source to selectively apply a test signal to a conductor at one end of a multiconductor cable and a detector to identify that conductor at the other end of the cable by detecting the presence of said signal, an improvement characterized in that said detector comprises,

first means for performing individual comparisons of the amplitudes of a plurality of input signals with the amplitude of a decreasing reference signal and for producing an output signal after a predetermined number of said comparisons exceed a predetermined value, said reference signal produced by said first means and decreasing in amplitude as a function of time until the occurrence of at least the first comparison of said predetermined number of comparisons, and said first means has input terminals for connection to the conductors of said cable for receiving said input signals, and

second means responsive to said output signal for indicating the input terminal on which appeared the input signal producing the last of said comparisons in excess of said predetermined value.

3,976,940

TESTING CIRCUIT

Yuk Bun Chau, Fremont, and Willis David Stinson, Jr., Saratoga, both of Calif., assignors to Fairchild Camera and Instrument Corporation, Mountain View, Calif.

Filed Feb. 25, 1975, Ser. No. 552,910

Int. Cl.² G01R *15/12, 31/00*

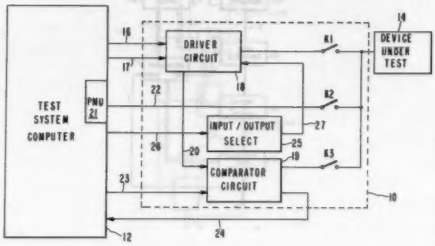
U.S. Cl. 324—73 R **8 Claims**

1. In a testing circuit having a terminal disposed for connection to a device under test wherein a stimulus is supplied to the device under test in accordance with a first state of the testing circuit and a response is received from the device under test in accordance with a second state of the testing circuit, comprising:

a. driving circuit means disposed for supplying a test stimuli signal to the device under test during the first state of the testing circuit, said test stimuli signal being generated by said driving circuit means in response to the combination of a pulse code input signal and first and second reference

voltage inputs, whereby said test stimuli signal has a frequency equal to said pulse code input signal, a first amplitude equal to said first reference voltage and a second amplitude equal to said second reference voltage;

b. comparing means disposed for providing an output signal indicating a pass and a failure of the device under test during the second state of the testing circuit and having a first input terminal coupled to the device under test and second and third input terminals coupled to third and fourth reference voltages, whereby the comparing means output signal indicates a pass test when the amplitude of the response from the device under test is equal to or exceeds the respective amplitudes of said third and fourth reference voltages, and the comparing means output



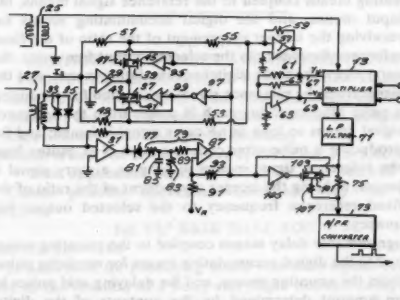
signal indicates a fail test when the amplitude of the response from the device under test fails to meet or exceed said third and fourth reference voltage levels; said comparing means comprising a pair of comparator circuits, wherein a first input of a first one of said pair is coupled to said third reference voltage and a first input of a second one of said pair of coupled to said fourth reference voltage, and a second input of each of said pair is coupled to an output of the device under test; and

c. a multiplexer circuit coupled between output terminals of said pair of comparators and the output terminal of said comparing means for switching between the output terminal of said pair of comparator circuits in accordance with the frequency of said pulse code input signal.

3,976,941
AUTO-RANGING SYSTEM FOR AN ELECTRONIC ENERGY METER

Miran Milkovic, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Sept. 13, 1974, Ser. No. 505,721
Int. Cl.² G01R *7/00, 11/32, 7/12*
U.S. Cl. 324—142 **10 Claims**



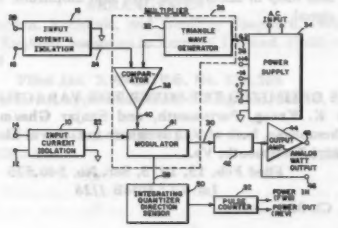
1. In an electronic watt-hour meter for measuring the power consumed in an electrical powering consuming system including means for measuring the current in said system, means for measuring the voltage across the load impedance of said system, means for multiplying said measured current by said measured voltage to derive a product signal proportional to the power consumed in said system and means for converting said product signal to a pulse train having a pulse rate which is proportional to said product signal, the improvement comprising:

means responsive to said current measuring means for incrementally varying the value of said measured current inversely as said measured current reaches each of a plurality of discrete levels, and means responsive to said current measuring means for incrementally varying the pulse rate of said pulse train as said measured current reaches each of said plurality of discrete levels, said pulse rate varying means incrementally increasing the pulse rate as said measured current is incrementally decreased and vice versa, to thereby maintain the ratio of pulses generated to power measured constant.

3,976,942
WATT/WATT HOUR TRANSDUCER HAVING CURRENT SIGNALS AND A MODULATOR THEREFOR

Glenn A. Mayfield, Columbus, Ohio, assignor to Esterline Corporation, New York, N.Y.

Filed Dec. 13, 1974, Ser. No. 532,500
Int. Cl.² G01R *21/06*
U.S. Cl. 324—142 **14 Claims**



1. A method for metering an electrical power line from signals proportional to the instantaneous voltage and current of said power line, said method comprising:

a. developing a high impedance current source from one of said signals;

b. pulse width modulating the current of said current source through series connected watt section load means and watthour integrator load means with a modulating signal proportional to the amplitude of the other of said signals, said watt section load means providing an output proportional to the instantaneous power through said line and said watthour integrator load means providing an output proportional to the time integral of power through said line.

3,976,943
PHASE LOCK LOOP AM/FM RECEIVER

John A. Cipher, Garland, and Malcolm M. Lorang, McKinney, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

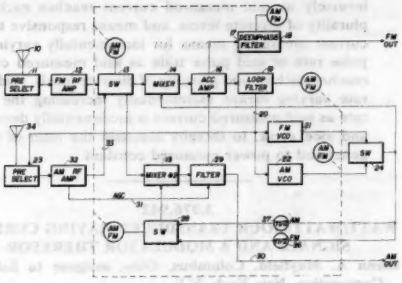
Filed Aug. 19, 1974, Ser. No. 498,493
Int. Cl.² H03D *3/02*
U.S. Cl. 325—317 **10 Claims**

1. In a modulated signal processor, the combination comprising:

a. a coherent demodulator loop for detection of a modulated signal including mixer means, amplifier means and voltage controlled oscillator means at least one of said means having a variable gain control capability,

b. generator means to generate the amplitude modulation signal of a modulated input signal,

c. means to apply said modulated input signal to said demodulator loop and to said generator, and



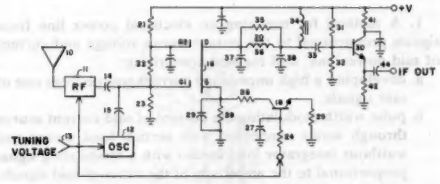
d. means to apply said amplitude modulation signal as the gain control voltage to said means having variable gain control capability within said loop to control the gain of said loop in accordance with said amplitude modulation signal.

3,976,944

BIAS OPTIMIZED FET MIXER FOR VARACTOR TUNER

Jack K. Kreng, Portsmouth, and Sanjar Ghaem-maghami, Chesapeake, both of Va., assignors to General Electric Company, Portsmouth, Va.

Filed Feb. 13, 1975, Ser. No. 540,525
Int. Cl.² H04B 1/28
U.S. Cl. 325—451 **6 Claims**



1. In a tuner of the type for receiving an RF signal and having oscillator means including a tuning element responsive to a tuning voltage to generate a channel related signal, wherein the amplitude of said channel related signal differs for the channels within the frequency band being tuned, a FET mixer comprising:

a FET having electrode means including at least gate and source electrodes and coupled by said electrode means to receive said RF signal and said channel related signal to generate an IF signal,

first means coupled to said electrode means to develop the bias therefore to establish the optimum DC operating point for said FET for one of said channels and,

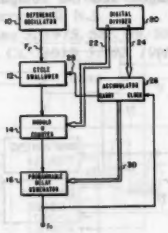
second means coupled to said electrode means and responsive to said tuning voltage to modify FET drain current to establish the optimum DC operating point for said FET for at least another of said channels within said band.

3,976,945

FREQUENCY SYNTHESIZER

Roger G. Cox, Loveland, Colo., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Sept. 5, 1975, Ser. No. 610,604
Int. Cl.² H03B 19/00
U.S. Cl. 328—14 **10 Claims**



1. A frequency synthesizer for generating an output signal having a selected output frequency that is any rational fraction of the frequency of a reference signal, the frequency synthesizer comprising:

reference signal means for generating a pulsed signal having a fixed reference frequency;

input means for entering into the frequency synthesizer the integer component and the fractional component of the ratio of the fixed reference frequency to the selected output frequency;

digital accumulating means coupled to the input means for receiving the fractional component of the ratio of the fixed reference frequency to the selected output frequency, and for periodically summing, in response to a pulse of the synthesizer output signal, the fractional component of that ratio and the result of any previous summations stored in said digital accumulating means, and for issuing a carry signal whenever the result of a periodic summation exceeds the storage capacity of said digital accumulating means;

counting means coupled to the reference signal means, the input means, and the digital accumulating means for receiving the integer component of the ratio of the fixed reference frequency to the selected output frequency, the carry signal from the digital accumulating means, and the signal from the reference signal means, and for producing a pulse after counting each N pulses from the reference signal means so long as no carry signal is issued, and for producing a pulse after counting each N+1 pulses from the reference signal means so long as a carry signal is issued, N being the integer component of the ratio of the fixed reference frequency to the selected output frequency;

programmable delay means coupled to the counting means and to the digital accumulating means for receiving pulses from the counting means, and for delaying said pulses by an amount determined by the contents of the digital accumulating means to produce said output signal; and

clearing means for periodically resetting the stored contents of the digital accumulating means to zero.

3,976,946

CIRCUIT ARRANGEMENT FOR FREQUENCY DIVISION BY NON-INTEGRAL DIVISORS

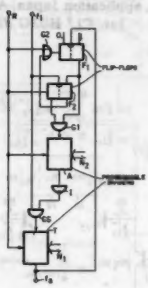
Gert Schroder, Hamburg, Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 20, 1974, Ser. No. 534,764

Claims priority, application Germany, Jan. 5, 1974, 2400394

Int. Cl.² H03K 21/00, 21/32, 23/06

U.S. Cl. 328—39 2 Claims



1. A circuit arrangement for generating an output frequency by division of pulses of an input frequency, comprising a first adjustable frequency divider providing the output of said circuit arrangement, a further adjustable frequency divider, a first gate having an output connected to the input of said first adjustable frequency divider and having a first input connected to the output of said further adjustable frequency divider, means applying the input frequency to a second input of said first gate, said further adjustable frequency divider suppressing selectable pulses of said input frequency applied to said first gate, the division ratio of at least one of said first and said further frequency dividers being adjustable in response to selection signals, two cascade connected counters providing said selection signals, a second gate having an output connected to an input of said cascade counters and having a first input connected to receive said input frequency, and timing means for providing an enabling signal to a second input of said second gate for a time interval equal to a predetermined number of periods of said input frequency, said cascaded counter counting the pulses of said input frequency during said predetermined time interval and adjusting the division ratio of said one of said adjustable frequency dividers in accordance with the number of pulses of said input frequency counted by said counter.

3,976,947

METHOD AND CIRCUIT ARRANGEMENT FOR PRODUCING ELECTRICAL REFERENCE PULSES

Volker Guyot, Klein-Gerau; Paul Holdinghausen, and Martin Mueller, both of Bickenbach, all of Germany, assignors to Carl Schenck AG, Darmstadt, Germany

Division of Ser. No. 250,727, May 5, 1972, Pat. No. 3,852,673.

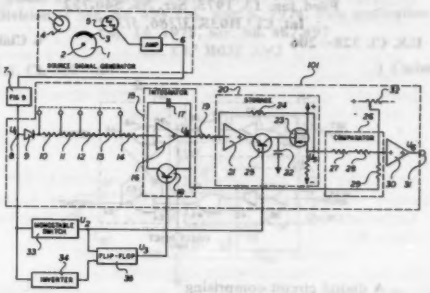
This application Sept. 16, 1974, Ser. No. 506,108

Claims priority, application Germany, May 10, 1971, 2122967

Int. Cl.² H03K 5/153, 5/20

U.S. Cl. 328—108 5 Claims

1. A method for producing timed reference signals responsive to the rotation of a body carrying a marker, comprising sensing said marker to produce a train of rectangular pulse signals, storing a value corresponding to the width of each pulse signal, integrating each pulse signal, and comparing said stored value corresponding to one pulse signal with th integrated signal corresponding to a succeeding pulse signal, thereby producing said timed reference signals at the centers



of said rectangular pulse signals, whereby said timed reference signals indicate the angular displacement of said body.

3,976,948

PULSE-FREQUENCY SENSITIVE SWITCHING CIRCUIT ARRANGEMENT

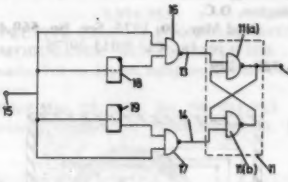
Brian Dearden, Rochdale, and Geoffrey Shepherd, Oldham, both of England, assignors to Ferranti Limited, Hollinwood, England

Filed Jan. 3, 1975, Ser. No. 538,269

Claims priority, application United Kingdom, Jan. 5, 1974, 522/74

Int. Cl.² H03B 3/04

U.S. Cl. 328—138 5 Claims

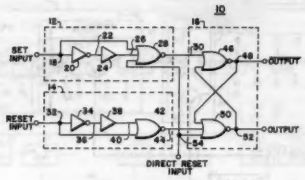


1. A frequency sensitive switching circuit arrangement comprising a circuit input terminal arranged to receive input pulses from a pulse train, a bistable switching arrangement having first and second input terminals and responsive to the application of an input pulse, by way of the circuit input terminal, to either one of said first or second input terminals to provide an output signal having a first or second level respectively, first switching means responsive to a time interval between successive input pulses of less than a first preset period to apply said pulses to the first input terminal, and second switching means responsive to a time interval between successive input pulses in excess of a second preset period, longer than the first, to apply said pulses to the second input terminal, the first and second switching means being responsive to a time interval between successive pulses of between said first and second preset periods to prevent said pulses being applied to either the first or second input terminals.

3,976,949
EDGE SENSITIVE SET-RESET FLIP FLOP

Edward C. Hepworth, Apache Junction, and Rodney J. Means, Tempe, both of Ariz., assignors to Motorola, Inc., Chicago, Ill.

Filed Jan. 13, 1975, Ser. No. 540,752
Int. Cl.² H03K 3/286, 3/353
U.S. Cl. 328—206 6 Claims

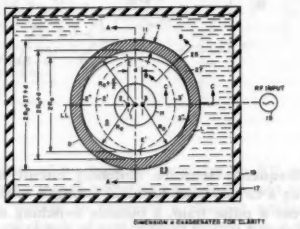


1. A digital circuit comprising:
a. a first input terminal;
b. memory means having a first memory input for storing a digital representation of a predetermined input signal transition on said first input terminal;
c. a first coincident gate having an output coupled to said first memory input and having a first and a second gate input;
d. a first non-inverting delay element having an output coupled to said first gate input and having a first delay input;
e. an inverting element having an output coupled to said delay input and having an input coupled to said first input terminal and also coupled to said second gate input.

3,976,950
ECCENTRIC SUPERCONDUCTING RF CAVITY SEPARATOR STRUCTURE

John R. Aggus, Shoreham; Salvatore T. Giordano, Port Jefferson, and Henry J. Halama, Shoreham, all of N.Y., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Mar. 20, 1975, Ser. No. 560,426
Int. Cl.² H01J 29/70
U.S. Cl. 328—229 4 Claims

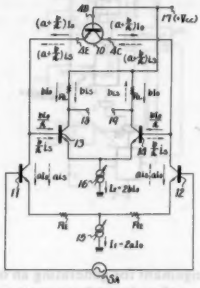


1. In apparatus for receiving and transporting a high energy beam of charged particles along an equilibrium axis having an RF separator forming an iris-loaded deflecting cavity for extracting charged particles from the beam tangentially to said axis, the improvement comprising:
a. an eccentric-shaped iris-loaded deflecting cavity means arranged along the equilibrium axis, said deflecting cavity being formed from circular disc-shaped electron-beam welded sections that are butted and circularly welded, at uniform thickness, flat, non-stepped circular joints;
b. means for energizing the deflecting cavity means with radio-frequency electrical energy to deflect the charged particles from the equilibrium axis for extracting the particles tangentially from the beam; and
c. means for maintaining the deflecting cavity means at superconducting temperatures.

3,976,951
GAIN CONTROL CIRCUITS UTILIZING A NOVEL SEMICONDUCTOR DEVICE

Yoshio Ishigaki, Tokyo, and Takashi Okada, Yokohama, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Mar. 26, 1975, Ser. No. 562,348
Claims priority, application Japan, Apr. 4, 1974, 49-38179
Int. Cl.² H03G 3/30
U.S. Cl. 330—29 9 Claims



9. A gain control circuit comprising:
a. a first differential amplifier stage having first and second amplifying devices and a first current sink connected in common to both the first and second amplifying devices;
b. a second differential amplifier stage having third and fourth amplifying devices, input terminals of said third and fourth amplifying devices being connected to output terminals of said first and second amplifying devices, respectively, and a second current sink connected in common to both the third and fourth amplifying devices;
c. signal input means connected to at least one of the input terminals of said first and second amplifying devices;
d. signal output means connected to at least one of the output terminals of said third and fourth amplifying devices; and
e. a bidirectional bipolar junction type semiconductor device having first, second and third terminals, said first and third terminals being connected to output terminals of said first and second amplifying devices, respectively, and said second terminal being connected to a substantially constant operating voltage source.

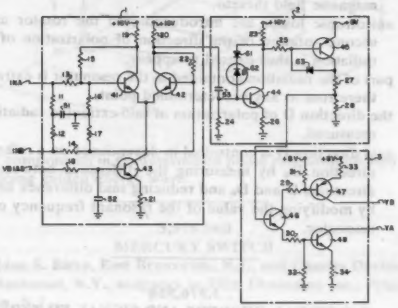
3,976,952
SENSE AMPLIFIER

David M. Shaver, Brockville, Canada, assignor to GTE Automatic Electric (Canada) Limited, Brockville, Canada

Filed Aug. 16, 1974, Ser. No. 498,157
Int. Cl.² H03F 3/45
U.S. Cl. 330—30 D 4 Claims

1. A sense amplifier comprising:
balanced differential input means having an output;
threshold circuit means coupled to the output of said differential input means having an output, said threshold circuit means comprising
an AC coupling capacitor,
false trigger prevention means,
first amplifying transistor means and second output transistor means,
whereby the output of said balanced differential input means is coupled to the base of said first amplifying tran-

sistor means though said AC coupling capacitor and the output of said first amplifying transistor means is coupled to the base of said second output transistor means and the ouput of said second output transistor means is a single



output at a specified voltage, and said false trigger prevention means is coupled to said first amplifying transistor means; and

complementary output means coupled to the output of said threshold circuit means.

3,976,953

HIGH EFFICIENCY BROAD BAND TRAVELING-WAVE AMPLIFIER HARMONIC CONDITIONING

Walter E. Garrigus, Santa Ana, and Murry I. Glick, Redondo Beach, both of Calif., assignors to Aeronutronic Ford Corporation, Blue Bell, Pa.

Filed Oct. 21, 1974, Ser. No. 516,635

Int. Cl.² H03F *3/58*

U.S. Cl. 330—43 7 Claims

1. In a microwave signal amplifying system capable of amplifying signals over at least two frequency octaves, said system comprising a traveling-wave output amplifier driven at near saturation, a traveling-wave driver amplifier ooerated in a region that results in significant harmonic amplitude generation, and phase shifting means connected between said traveling-wave driver amplifier and said traveling-wave output amplifier, the improvement comprising:

first signal equalizing means connected to the input of said traveling-wave driver, said first signal equalizing means having an attenuation peak at a frequency *nf*, where *f* is a frequency within and near the low frequency end of the passband of said output amplifier and *n* is an integer selected from the integers 2 and 3, and

second signal equalizing means connected between the output of said traveling-wave driver and the input of said traveling-wave output amplifier, said second equalizing means having an attenuation peak at a frequency *mf*, where *m* is the other of said integers 2 and 3, the values of said attenuation peaks being selected to provide maximum harmonic cancellation in said system.

3,976,954

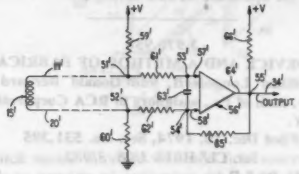
ANTI-SKID BRAKE CONTROL SYSTEM AND COMPONENTS THEREOF

Said Sapir, Los Angeles, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Division of Ser. No. 495,226, Aug. 6, 1974. This application Apr. 14, 1975, Ser. No. 567,497

Int. Cl.² H03F *3/45*

U.S. Cl. 330—69 1 Claim



1. In noise suppression apparatus, the combination comprising: a signal source having first and second long output leads, said first and second leads having first and second outer ends, respectively, both of said outer ends being remote from said signal source; first and second junctions remote from said signal source and connected from said first and second outer ends, respectively, of the respective leads thereof; a first resistor connected from said first junction to a conductive point; a source of D.C. potential connected from said conductive point to ground; a second resistor connected from said second junction to ground; a differential amplifier having an inverting input lead, a non-inverting input lead and an output lead; a third resistor connected from said first junction to said inverting input lead; a fourth resistor connected from said second junction to said non-inverting input lead; a capacitor connected between said amplifier input leads; a fifth resistor connected from said amplifier output lead to said non-inverting input lead; a sixth resistor connected from said amplifier output lead to said point.

3,976,955

PROTECTIVE CIRCUIT FOR PULSE WIDTH MODULATED SIGNAL AMPLIFIER

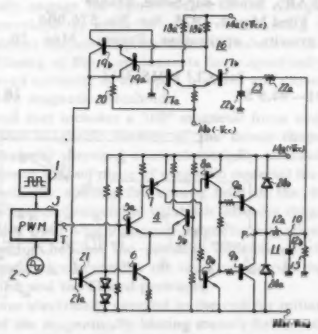
Osamu Hamada, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Mar. 25, 1975, Ser. No. 561,923

Claims priority, application Japan, Mar. 30, 1974, 49-36172

Int. Cl.² H03F *3/387*

U.S. Cl. 330—207 P 8 Claims



4. The combination of a pulse width modulated signal amplifier and a protective circuit comprising:

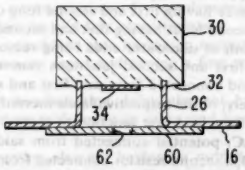
means for producing a pulse width modulated signal,
means for demodulating said pulse width modulated signal,
a load, an amplifier for receiving said pulse width modulated signal and for amplifying the same,
means for DC coupling the output of said amplifier through said demodulator to drive said load,
detecting means for detecting the presence of a DC signal at the output of said amplifier and for producing a control signal, and
protective means for receiving said control signal so as to cut off the operation of said amplifier.

3,976,956

LASER DEVICE AND A METHOD OF FABRICATION

Richard William Longsderff, and Donald Bernard Kaiser, Lancaster, both of Pa., assignors to RCA Corporation, New York, N.Y.

Filed Dec. 10, 1974, Ser. No. 531,395
Int. Cl.² H01S *3/08, 3/082*
U.S. Cl. 331—94.5 D **5 Claims**



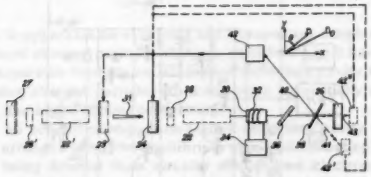
1. A laser tube comprising:
an open ended tube;
a metal plate extending across and sealed to one end of the tube;
an annular hub extending longitudinally outward from the metal plate coaxial with the tube;
a glass block extending across and closing the outer end of the hub, the outer end of the hub extending into the body of the block so that the block is sealed to the hub; and
an optical mirror on the surface of the glass block within and spaced from the hub.

3,976,957

METHOD OF FREQUENCY-STABILIZATION OF A LASER AND A LASER FOR CARRYING OUT SAID METHOD

Albert Le Floch, and Guy Stephan, both of Rennes, France, assignors to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly-sur-Seine, France

Filed May 9, 1975, Ser. No. 576,004
Claims priority, application France, May 10, 1974, 74.16161
Int. Cl.² H01S *3/13*
U.S. Cl. 331—94.5 S **18 Claims**



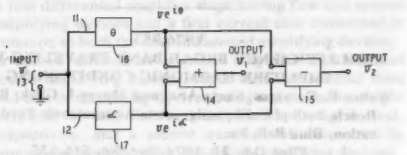
1. A method of frequency-stabilization of the stimulated radiation emitted by a laser constituted by an amplifying medium placed within a resonator formed by two mirrors in which a mode selector is operated for selecting a single mode from all the longitudinal modes which are capable of oscillating, wherein:
said radiation is subjected within the resonator to a first rotation of its direction of polarization by placing within the resonator a material which exhibits the magnetic rotatory polarization phenomenon and by applying a magnetic field thereto,
anisotropic losses are introduced into the rotator and a second rotation of the direction of polarization of said radiation is thus caused to appear,
part of the radiation contained in the resonator is extracted therefrom at any predetermined point,
the direction D of polarization of said extracted radiation is measured,
said direction D is controlled in dependence on a reference direction D_0 by measuring the difference between the directions D and D_0 and reducing said difference to zero by modifying the value of the resonant frequency of the resonator.

3,976,958

R-C SIGNAL DIVIDERS AND SIGNAL FILTERS

Harold Seidel, Warren, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

No Drawing. Filed Mar. 27, 1975, Ser. No. 562,574
Int. Cl.² H03H *7/06, 7/18, 7/30, 7/48*
U.S. Cl. 333—6 **7 Claims**



1. A signal divider comprising:
first and second wavepaths coupled at one end to a common input port and at their other ends to a summing network to form a sum signal, and to a differencing network to form a difference signal;
and phase shift means whose passive elements consist of resistive and capacitive elements disposed along at least one of said wavepaths for producing a nonlinear differential phase shift between signals in said two wavepaths.

3,976,959

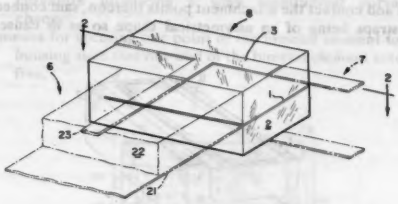
PLANAR BALUN

Russell A. Gaspari, 6656 W. 87th Place, Los Angeles, Calif. 90045

Continuation-in-part of Ser. No. 490,507, July 22, 1974, abandoned, which is a continuation-in-part of Ser. No. 387,936, Aug. 13, 1973, abandoned. This application July 21, 1975, Ser. No. 597,509
Int. Cl.² H01P *5/10*
U.S. Cl. 333—26 **8 Claims**

1. A balun block for microwave and higher frequencies comprising a planar dielectric member, a ground plane of conductive material centrally positioned within said member and conducting means passing around three sides of said member in spaced relationship to said plane, said conducting means comprising means to receive an incoming guided en-

ergy wave and to split said incoming wave into two components of equal phase and means to conduct and recombine



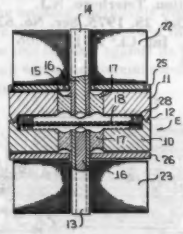
said components in predetermined phase relationships into an outgoing guided energy wave.

3,976,960

MERCURY SWITCH

Sheldon S. Bitko, East Brunswick, N.J., and Charles Davidoff, Manhasset, N.Y., assignors to Fifth Dimension Inc., Princeton, N.J.

Filed Jan. 7, 1974, Ser. No. 431,424
Int. Cl.² H01H *1/08*
U.S. Cl. 335—58 **8 Claims**



1. A hermetically sealed switch, comprising a concave dish of resistance weldable metal, a magnetic flexible reed armature located in said dish and electrically connected to said dish, a stationary contact, an insulator extending insulatedly through said dish from exteriorly to interiorly of said dish, said stationary contact extending through said insulator, a closure cap of resistance weldable metal peripherally welded about the periphery of said dish to form with said concave dish a hermetically sealed enclosure, the welded surfaces of said cap and header being coated with electroless nickel.

3,976,961

SENSOR-DETECTOR ASSEMBLY FOR MICROWAVE OVEN

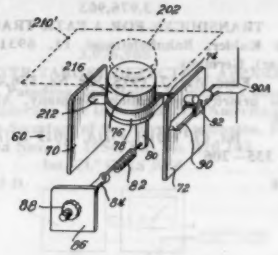
Donald G. Moore, Glencoe, Ill., assignor to Chemetron Corporation, Chicago, Ill.

Division of Ser. No. 380,187, July 18, 1973, Pat. No. 3,854,022, which is a continuation-in-part of Ser. No. 300,763, Oct. 25, 1972. This application Sept. 16, 1974, Ser. No. 506,353
Int. Cl.² H01H *61/00*
U.S. Cl. 335—146 **13 Claims**

1. A sensor-detector assembly for detecting and integrating quantities of microwave energy comprising:

a ferromagnetic member adapted for exposure to microwave energy and adopting a paramagnetic state when heated to above its Curie point by said energy; and

a detector assembly including a source of magnetic field which is mounted for movement about a pivotal axis to a first position by magnetic attraction with said ferromagnetic member, means for urging said field source away from said first position, whereby said field source is moved away from said first position when said ferromagnetic member reaches a paramagnetic state, and mercury



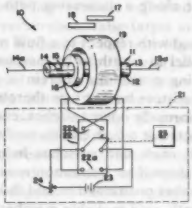
switch means movable with said field source and operative to provide an indication when said field source is moved away from said first position.

3,976,962

DUAL THRESHOLD MAGNETIC PROXIMITY SWITCH

Robert L. Seeley, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 25, 1975, Ser. No. 572,473
Int. Cl.² H01H *51/22*
U.S. Cl. 335—153 **2 Claims**



1. In a dual threshold switch having an elongate dielectric envelope containing a pair of read contacts actuatable to an open position and a closed position by external magnetic actuation fields originating beyond the physical dimensions of the switch, an improvement therefor is provided comprising:

a donut shaped piece of rubber-bonded barium-ferrite magnetic material having a lateral opening sized to frictionally engage the outer surface of the elongate dielectric envelope to allow its selective mounting thereon, the donut shaped magnetic material induces a 360° magnetic biasing of the reed contacts for magnetically biasing the reed contacts to the open position and closed position at two magnetic thresholds;

a coil that includes a 360° magnetic force overcoming the 360° magnetic biasing of the donut shaped magnetic material disposed circumferentially outwardly from the donut shaped piece of magnetic material for electromagnetically shifting the biasing field of the donut shaped magnetic material to establish different magnetic thresholds from which external magnetic actuation fields originating beyond the physical dimensions of the switch magnetically actuate the reed contacts to the open position and the closed positions;

means electrically coupled to the coil for initiating the shift of the magnetically biasing mean's field; and

means enveloping the dielectric envelope and reed contacts, the donut shaped piece of rubber-bonded barium-ferrite magnetic material and the coil for dielectri-

cally potting them therein to ensure more reliable operations.

3,976,963

TRANSDUCER FOR A PATH TRACER

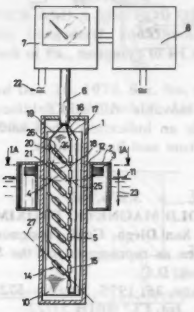
Heinrich Kubler, Bahnhofstrasse 11, 6931 Zwingenberg (Neckar), Germany

Filed Mar. 7, 1975, Ser. No. 556,417

Claims priority, application Germany, Apr. 19, 1974, 2418860

Int. Cl.² H01H *35/18*; G01F *23/10*

U.S. Cl. 335—206 **5 Claims**



1. A device for detecting and transmitting the position of a movable member along a measuring path, said device comprising:

a tube positioned with respect to a fluid medium and having an axis parallel to a path to be measured;

said tube having positioned therein a plurality of series connected resistors having taps therebetween;

a plurality of normally open switches, each of said switches being connected at a first end thereof to a respective one of said taps, each said switches being connected at a second end thereof to a common measuring line;

a movable member positioned in said fluid medium to move along said path, said movable member being mounted to be freely rotatable about an axis thereof parallel to said path;

said movable member carrying therein switching magnet means for closing one only of said switches when said magnet means is positioned opposite such switch, and for closing two adjacent switches only when said magnet means is positioned opposite a space between such two adjacent switches; and

indicating means, connected to said series connected resistors and to said common measuring line and responsive to a tapped resistance value across said common measuring line due to closing of switches, for indicating the position of said movable member along said path.

3,976,964

SHORTING RING FOR AN AC SWITCHING MAGNET

Gunther Bohlke, Amberg, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

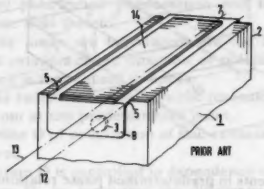
Filed May 22, 1973, Ser. No. 362,831

Claims priority, application Germany, May 31, 1972, 7220530[U]

Int. Cl.² H01F *7/10*

U.S. Cl. 335—245 **5 Claims**

1. In an AC switching magnet having a pole end face slotted to accept a shorting ring, said pole being made up of a plurality of laminations connected by at least one rivet, and having on each end of the pole, externally at the end of the rivet, an attachment point, said magnet, during switching being subject to an acceleration having an axis directed essentially perpendicular to the pole end face, an improved shorting ring comprising a shorting ring sized to fit in the pole slot with a connecting strap on each end adapted to fit over the ends of the pole and contact the attachment points thereon, said connecting straps being of an assymetrical shape so as to cause a



longitudinal axis through the center of gravity of said shorting ring, when viewed along the axis of and in the direction of the acceleration to which the magnet is subjected to either coincide with or be behind the line connecting the attachment points.

3,976,965

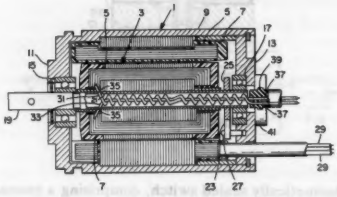
PAIRED COILED CONDUCTORS COMPACT-LONG LIFE

Casimer Frank Remus, Tunkhannock, Pa., assignor to The Bendix Corporation, Teterboro, N.J.

Filed Oct. 28, 1975, Ser. No. 626,609

Int. Cl.² H01F *21/06*

U.S. Cl. 336—120 **7 Claims**



1. Electrical apparatus comprising a rotor and a stator, the rotor having a winding thereon, a shaft supporting said rotor for rotation relative to said stator and having a hollow interior portion, leads connected to the rotor winding for connecting the winding to non-rotating circuitry, each of the leads having a straight portion and a coil portion and the leads being disposed in the hollow interior portion of the shaft with the coil of one lead being arranged around the straight portion of the other lead and the coil of the other lead being arranged around the straight portion of the first lead.

3,976,966

ELECTRIC SEQUENCER AND ELECTRIC HEATING SYSTEM

Harold A. McIntosh; Hollis L. Randolph, and Bradford N. Hull, all of Los Angeles, Calif., assignors to Robertshaw Controls Company, Richmond, Va.

Filed Aug. 6, 1974, Ser. No. 495,167

Int. Cl.² H01H *61/00*

U.S. Cl. 337—104 **16 Claims**

1. An electrothermal operated relay comprising

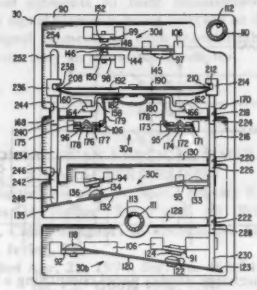
a housing,

an electric switch mounted in the housing and having a pair of electrical contacts, one of the pair of contacts being resiliently biased,

an elongated strip-like bimetal element formed with a transverse curvature which is straightened by transverse temperature warp of the bimetal element produced by increasing temperatures, said transverse curvature retain-

ing the bimetal element against longitudinal curvature until a temperature is reached whereat longitudinal curvature forces exceed retaining forces of the transverse curvature producing a snap longitudinal curvature change,

means for securing one point of the bimetal element to the housing such that one end of the bimetal element extends free,



electric heating means mounted in the housing for heating the bimetal element, and

an operator in the housing operatively disposed between the one end of the bimetal element and the electrical switch for moving the one contact against its bias to operate the electrical switch when the bimetal element changes longitudinal curvature.

3,976,967

ELECTRICAL PLUG WITH REPLACEABLE FUSES

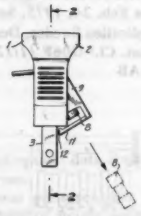
Dino Magherini, Via Osservatorio 36, Florence, Italy

Filed Dec. 11, 1974, Ser. No. 531,819

Claims priority, application Italy, Dec. 12, 1973, 9719/73; Jan. 25, 1974, 9323/74

Int. Cl.² H01H *85/22*

U.S. Cl. 337—211 **19 Claims**



1. An electrical connector plug comprising a body, first electrical connector elements mounted in said body for electrical connection with an electrical device, second electrical connector elements mounted in said body for electrical connection with an electrical power source, means replaceably supporting electrical fuses in said body between said first and second connector elements to establish electrical connection there between, external pin means mounted on said plug in electrical connection with said second connector elements for being inserted in the slots of an electrical power outlet, said means supporting the fuses comprising a carrier casing and a hinge pivotably mounting said casing in said body for movement between an operative inserted position in which the fuses electrically connect the first and second connector elements, and an inoperative retracted position in which the first and second connector elements are disconnected and the fuses are free of electrical connection and are accessible outside said body for removal and replacement, whereby said pin means can remain in the slots of the electrical power outlet and the fuses can be handled while disconnected from electrical power.

3,976,968

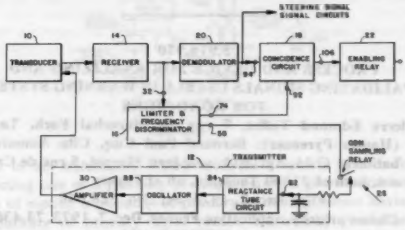
UNDERWATER TARGET DETECTION APPARATUS

Jack H. Slaton, Pasadena, and Halley Wolfe, La Canada, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 19, 1954, Ser. No. 470,142

Int. Cl.² G01S *9/66*

U.S. Cl. 340—3 D **8 Claims**



3. An underwater moving-target detection system comprising, in combination, means for generating and projecting acoustic energy at an adjustable carrier frequency as generated, means for receiving resultant reflected acoustic energy including water reverberation, false-target echoes at substantially reverberation frequency, and moving-target echoes at differing frequencies, means responsive to said received reverberation and adapted to readjust said generated carrier frequency to such value that the frequency of resultant reverberation, is received, is substantially of predetermined fixed value, and coincidence circuit means for enabling utilization of only such said echoes which as received exhibit frequencies differing from said predetermined fixed value of frequency by more than a target-doppler threshold value.

3,976,969

UNDERWATER SOUND WAVE DIRECTION FINDING SYSTEM

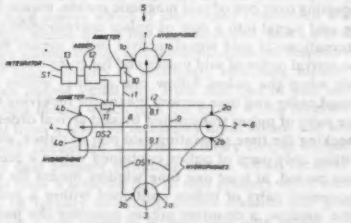
Wilfried Meuser, Bremen-Borgfeld, Germany, assignor to Fried. Krupp Gesellschaft mit beschrankter Haftung, Essen, Germany

Filed Mar. 11, 1975, Ser. No. 557,374

Claims priority, application Germany, Mar. 21, 1974, 2413544

Int. Cl.² G01S *3/80*

U.S. Cl. 340—6 R **5 Claims**



1. In a method for determining the direction of impinging sound waves according to the sum/difference principle by forming a sum signal and two difference signals, in a gradient

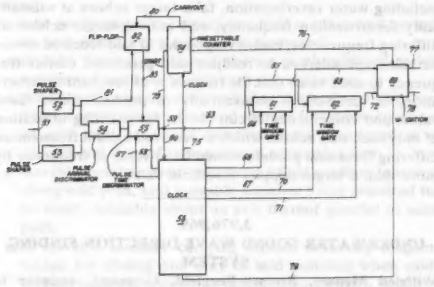
ranging receiving system composed of four omnidirectional piezoelectric hydrophones arranged at distances from one another which are small compared to the wavelength of the sound waves to be received, the hydrophones being arranged in two pairs which are angularly offset by 90° with respect to one another, the improvement comprising: conductively connecting together the two hydrophones of each pair to form a short-circuit series connection therebetween; forming the sum signal (S1) by algebraically adding the electrical currents in the two short-circuit series circuits formed by the two pairs and subsequently integrating the sum of the two currents; forming a first difference signal (DS1) on the basis of the potential difference across the hydrophones of one hydrophone pair; and forming a second difference signal (DS2) on the basis of the potential difference across the hydrophones of the hydrophone pair.

3,976,970

PROCESS AND DEVICE FOR ANALIZING AND VALIDATING SIGNALS USABLE IN WARNING SYSTEMS FOR ROAD-SIGNS

Pierre Edmond Tuffet, 7 rue du Marechal Foch, Tarbes (Hautes Pyrenees); Bernard Paul Cuq, Cite Amouroux, batiment C 44, Apt. 911, and Jean Margot, 5 rue de Castanet, both of 31500 Toulouse, all of France

Filed Dec. 2, 1974, Ser. No. 528,640
Claims priority, application France, Dec. 7, 1973, 73.43683
Int. Cl.² G08G 1/00
U.S. Cl. 340—32 **6 Claims**



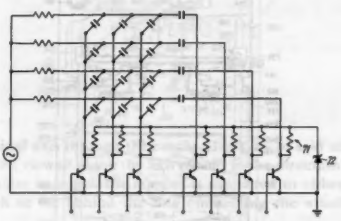
1. A road-sign warning system for a vehicle, comprising first and second orientated magnetic means to generate localized magnetic fields, provided in the road at some distance from each other, sensor means arranged on said vehicle, said sensor means generating a signal of sinusoidal shape when the vehicle is passing over one of said magnetic means, means for converting said signal into a pair of pulses corresponding to the two alternations of said signal, arrival order means for checking the arrival order of said pulses and for transmitting said pulses only when the pulses follow one another within a predetermined order and time period, means for receiving said successive pairs of pulses transmitted by said arrival order means, for checking the time separating said pair of pulses, and for transmitting only pairs of pulses contained within a predetermined time period, at least one time window means for transmitting successive pairs of pulses contained within a predetermined time window, a counting means counting the pairs of pulses transmitted by said arrival order means and passing the output of the time window means if this number corresponds to a predetermined number of pairs of pulses, and warning means for receiving said passed pulses and emitting a warning signal.

3,976,971

GAS-DISCHARGE DISPLAY PANEL HAVING A THIRD GROUP OF ELECTRODES FORMING CONTROL DISCHARGE SPACES

Tunekiyo Iwakawa, and Akira Yano, both of Tokyo, Japan, assignors to Nippon Electric Company, Ltd., Tokyo, Japan

Filed Mar. 4, 1975, Ser. No. 555,139
Claims priority, application Japan, Mar. 5, 1974, 49-25396
Int. Cl.² G06F 3/14
U.S. Cl. 340—324 M **10 Claims**



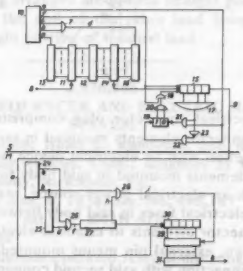
1. A gas-discharge display panel comprising a first substrate having a first group of electrodes formed on one surface, a second substrate having second and third groups of electrodes formed on one surface, said one surface of said first substrate being opposite to said one surface at said second substrate across a gap, thereby to define a plurality of display discharge spaces at positions where said second group of electrodes intersect at least one of said first group of electrodes and a plurality of control discharge spaces at positions where said third group of electrodes mate respectively with said first group of electrodes, said display and said control discharge spaces being adapted to have a discharge gas introduced therein, whereby voltage applied to said first group of electrodes is controlled by utilizing the constant-voltage characteristics of said control discharge spaces.

3,976,972

PREVENTION OF NON-ALLOWED CHARACTER COMBINATIONS

Kurt Arvid Aman, Johanneshov, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Continuation of Ser. No. 417,814, Nov. 21, 1973, abandoned. This application Feb. 24, 1975, Ser. No. 552,773
Claims priority, application Sweden, Dec. 14, 1972, 7216319
Int. Cl.² G06F 11/12
U.S. Cl. 340—146.1 AB **2 Claims**



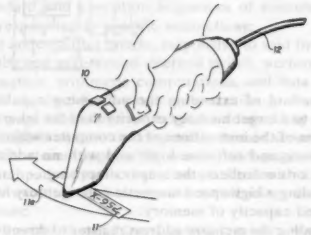
1. In an information system for serially transferring characters, wherein each character is represented by a coded combination of N signal elements which are transmitted serially in a single channel, a method of encoding characters to be transmitted so that non-allowable groups of N sequential signal elements are not transmitted comprising the steps of serially

generating characters represented by groups of N signal elements, serially arraying the generated characters into a stream of the signal elements, sequentially selecting each N-n of the signal elements of the stream without exception to form partial character groups of signal elements so that every signal element is in one of the partial character groups and some of the signal elements of a generated character are in one of the partial character groups and the remainder of the signal elements of the generated character are in an adjacent partial character group, and inserting into each partial character group n signal elements to form transmittable character groups, said n signal elements being selected so that the combination of signal elements of each transmittable character group represents only an allowable character.

3,976,973
HORIZONTAL SCAN VERTICAL SIMULATION CHARACTER READING

Charles E. Martin, Roswell, N. Mex.; Stanley C. Requa, deceased, late of Dallas, Tex., and by William Muir, Northridge, Calif., assignors to Recognition Equipment Incorporated, Irving, Tex.

Filed Apr. 22, 1974, Ser. No. 462,743
Int. Cl.² G06K 9/00, 7/10
U.S. Cl. 340—146.3 F **11 Claims**



1. A hand operated optical data acquisition and processing system which comprises:

a. a two-dimensional photosensitive array of width of at least five cells and of height substantially in excess of seven cells,

b. means to focus onto said array a field past which said array moves horizontally with the widest character in said field spanning at least five cells across said array,

c. a serial-in parallel-out shift register of width corresponding to the width of said array and having a height about 1½ times the height of a character,

d. means to connect said register to said array for storage of binary signals representing an image,

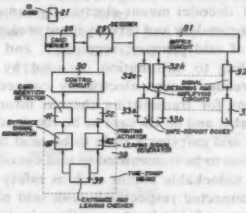
e. means to shift said signals through said register in direction to stimulate vertical movement of said array relative to said field at a rate which is high compared to the rate of said horizontal movement, whereby said signals may be interpreted as they move through said register, and

f. means to attempt a character recognition with each shift of said signals through said register.

3,976,974
CARD-CONTROLLED LOCK INSTALLATIONS INCLUDING MATRIX CIRCUITS

Kango Hinohara; Makoto Nishikawa; Noriaki Yokomoto, and Kenichi Matsumura, all of Hiroshima, Japan, assignors to Kabushiki Kaisha Kumahira Seisakusho, Japan

Filed Dec. 27, 1974, Ser. No. 537,109
Claims priority, application Japan, Dec. 29, 1973, 49-3772; Dec. 29, 1973, 49-3773
Int. Cl.² H04G 3/00
U.S. Cl. 340—149 A **10 Claims**



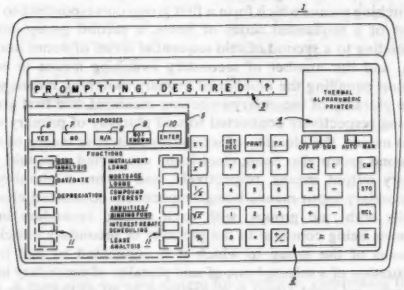
1. In an installation which includes a matrix system for selecting one of a plurality of outputs from a given combination of inputs, a plurality of primary switching means having a plurality of primary input means electrically connected thereto, respectively, for selectively energizing one of said primary switching means when the primary input means electrically connected thereto is actuated, a plurality of primary output means electrically connected with said plurality of primary switching means, respectively, for providing a signal at that one of said plurality of primary output means which is electrically connected with a selected one of said primary switching means which is energized by actuation of the primary input means electrically connected thereto, a plurality of secondary switching means divided into groups of secondary switching means which form a first group corresponding to the first of a sequential series of items, a second group corresponding to a second of said sequential series of items, and so on, and the number of secondary switching means in each group equalling the number of primary switching means with the plurality of secondary switching means of said first group being respectively connected to said plurality of primary output means, the plurality of secondary switching means of said second group also being electrically connected with said primary output means, respectively, and so on, a plurality of secondary input means being respectively connected electrically with said groups, with each of said secondary input means being common to the plurality of secondary switching means of the group to which it is connected so that upon actuation of a selected one of said plurality of secondary input means, an input signal is transmitted to all of the secondary switching means of the group electrically connected thereto while a primary output signal is received only by that one of the selected group of secondary switching means which is electrically connected with that one of said plurality of primary switching means which is electrically connected with a primary input means which has been actuated, and a plurality of secondary output means electrically connected respectively with all of said plurality of secondary switching means for providing an output signal only from that one of said secondary switching means which is in the group which receives an input signal from a selected secondary input means and which is electrically connected with the primary output means of that one of said primary switching means which receives an input signal from a selected one of said primary input means, a plurality of tertiary switching means divided into groups which include a first group of tertiary switching means corresponding to the first of a sequential series of items, a second group of tertiary switching means corresponding to a second of the sequential series of items, and so on, a plurality of

tertiary input means respectively connected electrically with said groups of tertiary switching means with each tertiary input means being common to the plurality of tertiary means of the group to which it is connected, and said groups of tertiary switching means having with respect to said plurality of secondary output means the same relationship that said plurality of secondary switching means have with respect to said plurality of primary output means, and a plurality of tertiary output means respectively connected electrically with said plurality of tertiary switching means so that a given one of said tertiary output means will receive an output signal in accordance with the selected one of said primary input means, secondary input means, and tertiary input means which have been actuated, decoder means electrically connected to all of said primary, secondary and tertiary input means for actuating one of each of said primary, secondary, and tertiary input means according to information decoded by said decoder means, card-reader means electrically connected with said decoder means for transmitting thereto information to be decoded thereby, and an ID card to be received by said card-reader means and carrying a code to be read thereby to provide information to be transmitted to said decoder means, and a plurality of unlockable means such as safety-deposit boxes electrically connected respectively with said plurality of tertiary output means for at least partially unlocking one of said unlockable means which receives a signal from the tertiary output means electrically connected thereto.

3,976,975
PROMPTING CALCULATOR

Michael J. Cochran, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Feb. 4, 1974, Ser. No. 439,473
Int. Cl.² G06F *15/02, 9/06, 3/14*
U.S. Cl. 340—172.5 **10 Claims**



1. A calculator system comprising:

a. a keyboard having numeric and function data entry keys and a plurality of response keys;

b. storage means for storing data and instructions including both single function instructions and multi-function program sequences of instructions, said stored sequences of instructions including prompting messages which indicate specific information required by the respective multi-function program in order to proceed with execution of said respective multi-function program;

c. control means for controlling the operation of said calculator on data in accordance with the program instructions stored in said storage means;

d. an arithmetic/logic means for performing arithmetic and/or logic operations in response to the stored instructions under control of said control means;

e. output display means for displaying alphanumeric data including said prompting messages;

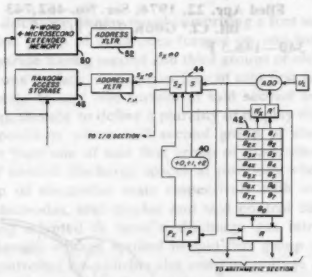
f. means selectively coupling said response keys to said control means for controlling said calculator to selectively proceed in the execution of a selected program sequence in one of a plurality of different preselected manners according to selective activation of said response keys in response to the display of said prompting messages; and

g. means selectively coupling said data entry keys to said control means for controlling said calculator to selectively proceed in the execution a selected program sequence according to the data entered in response to the display of said prompting messages.

3,976,976
METHOD AND MEANS TO ACCESS AND EXTENDED MEMORY UNIT

Vartan N. Khosharian, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 4, 1975, Ser. No. 565,305
Int. Cl.² G06F *9/20*
U.S. Cl. 340—172.5 **6 Claims**



1. A method of extending the addressing capability of a computer to a larger memory capacity than the inherent operand portion of the instructions of the computer without affecting hardware and software logic and with no additional instructions or controllers, the steps comprising:

a. providing a high-speed magnetic core memory having the desired capacity of memory;

b. extending the memory address register to directly address the higher capacity memory;

c. extending the program instruction register to directly address the higher capacity memory;

d. extending the index registers to create an extended data address register for directly addressing the higher capacity memory; and

e. providing a no-index register reference to create an extended data address register for addressing said higher capacity memory.

3,976,977
PROCESSOR FOR INPUT-OUTPUT PROCESSING SYSTEM

Marion G. Porter, Phoenix; Garvin Wesley Patterson, Glendale; William A. Shelly, and Nicolas S. Lemak, both of Phoenix, all of Ariz., assignors to Honeywell Information Systems, Inc., Phoenix, Ariz.

Filed Mar. 26, 1975, Ser. No. 562,317
Int. Cl.² G06F *3/00, 15/20*
U.S. Cl. 340—172.5 **8 Claims**

1. A processor for use in an input-output processing system which performs communication and control functions in a larger data processing system comprising:

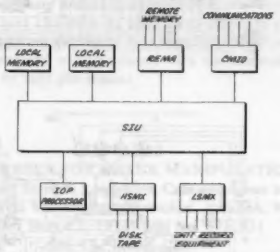
data input means, data-in register means, instruction register means, control store addressing switch means, control store means, a general register scratchpad, a first operand

switch, a second operand switch, adder/shifter means, working register means, a page table word scratchpad, process state and process control register means, result crossbar means, and data-out register means;

a. said instruction register means, responsive to said data input means and said control store means, receives and stores a plurality of instructions to be executed;

b. said second operand switch, responsive to data from said data-in register means, displacement and values from said instruction register means, and instruction counter increments and constants from said control store means, provides operands to said adder/shifter means and said page table word scratchpad;

c. said control store means, responsive to said instruction register means and said control store addressing switch means, stores addressable microinstructions including standard and execution sequences of microinstructions corresponding to specific instructions;



d. said adder/shifter means, responsive to said first operand switch and said second operand switch, performs address formation, arithmetic computations, and data manipulations required for instruction execution;

e. said page table word scratchpad, addressed by said working register means and responsive to said second operand switch stores page table words; said page table word scratchpad output is then concatenated with a portion of said working register means to develop absolute addresses;

f. said control store addressing switch means, responsive to said instruction register means, addresses said control store means and calls microinstructions to perform a return address request, a next address request, an exception/interrupt routine request, and a page table word miss indication;

g. said result crossbar means, responsive to said page table word scratchpad, said general register scratchpad, said process state and process control register means and said adder/shifter means, provides outputs to said data-out register means and said working register means and to an operator display panel;

h. said data-out register means, responsive to said result crossbar means, provides data outputs to other components of the data processing system;

i. said working register means, responsive to said result crossbar means, stores a temporary instruction count, data being processed, and memory addresses and also provides an address output and data output;

j. said general register scratchpad, responsive to said control store means and said working register store means, further comprises an instruction counter, a page table base register, and a plurality of general registers for providing inputs to said first operand switch in said result crossbar means;

k. said first operand switch, responsive to said working register means and said general register scratchpad, providing operands to said adder/shifter means;

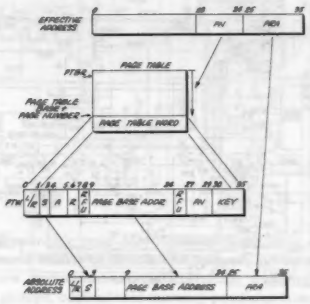
l. said process state and process control register means, responsive to said working register means, controls and monitors processor operation and provides inputs to said result crossbar means;

m. said data-in register means, responsive to said data input means, provides inputs to said second operand switch.

3,976,978
METHOD OF GENERATING ADDRESSES TO A PAGED MEMORY

Garvin Wesley Patterson, Glendale, and Marion G. Porter, Phoenix, both of Ariz., assignors to Honeywell Information Systems, Inc., Phoenix, Ariz.

Filed Mar. 26, 1975, Ser. No. 562,330
Int. Cl.² G06F 9/20
U.S. Cl. 340—172.5 **13 Claims**



1. In an input-output data processing system employing paged memory and executing a plurality of processes at multiple levels of priority, the method of efficiently developing memory addresses comprising the steps of:

a. providing a scratchpad memory for page table words in levels corresponding to priority levels of processes,

b. storing page table words in a level of said scratchpad memory at a position defined by the least significant bits of the page number of said page table word, and

c. accessing said scratchpad memory for a stored page table word corresponding to a page number of an effective address by examining the location defined by the least significant bits of said page number at the level corresponding to the priority level of the executing process.

3,976,979
COUPLER FOR PROVIDING DATA TRANSFER BETWEEN HOST AND REMOTE DATA PROCESSING UNITS

Kelvin L. Parkinson, Bolton, and Joseph M. Austin, Shrewsbury, both of Mass., assignors to Honeywell Information Systems, Inc., Waltham, Mass.

Filed Jan. 2, 1974, Ser. No. 430,110
Int. Cl.² G06F 15/16, 15/20
U.S. Cl. 340—172.5 **7 Claims**

1. A system for providing bidirectional data transfer between a host processor and a remote processor, wherein said host processor is configured to process words of a first length and wherein said remote processor is configured to process words of a second length, said system including a coupler for interfacing said processors, said coupler comprising:

A. means for detecting any one of a plurality of data transfer commands from said host processor, said data transfer commands including read and write data transfer commands;

B. an input register coupled for receiving data from said host processor;

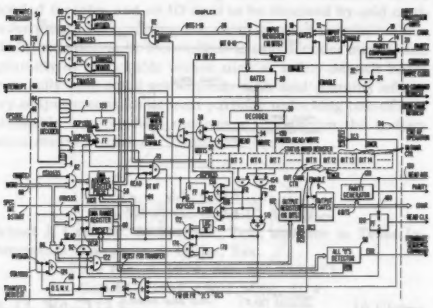
C. an output register coupled for receiving data from said remote processor;

D. first means for transferring data from said input register to said remote processor;

E. second means for transferring data from said output register to said host processor;

F. means for enabling said first and second means for transferring for the transfer of data from either said input or output registers to respectively said remote and host processors in response to either said write or read commands respectively;

G. status word register means comprising a plurality of bit locations, some of said locations for indicating whether a read or write data transfer command has been detected, said register means further including



1. an input counter, and

2. an output counter;

H. first means for changing the value of said input counter in response to a transfer of a subportion of a said word of said first length from said host processor to said input register;

I. second means for changing the value of said output counter in response to a transfer of a subportion of a said word of said second length from said output register to said host processor;

J. conversion means responsive to said input and output counter, including:

1. first means for providing a conversion of a said word of said first length to a said word of said second length, and

2. second means for providing a conversion of a said word of said second length to a said word of said first length; and

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3,976,980

DATA REORDERING SYSTEM

Theodore M. Hertz, Whittier, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Jan. 9, 1969, Ser. No. 789,998

Int. Cl.² G06F 7/10, 9/10

U.S. Cl. 340—172.5 **1 Claim**

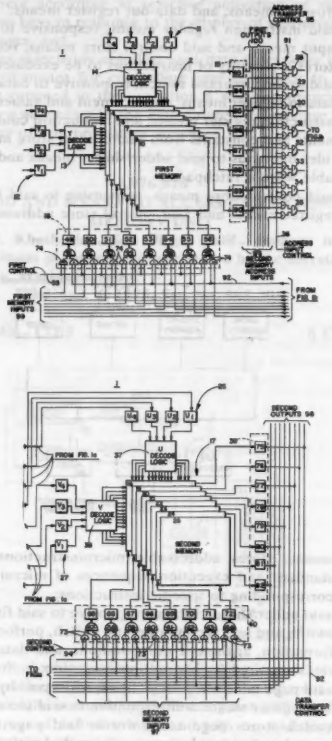
1. A data reordering system including first and second memories, said system comprising,

means for storing data in the first memory, said stored data being address locations in said second memory,

means for storing data in address locations in the second memory in a random order,

means addressing the data stored in the first memory, means responsive to said stored data for addressing locations in the second memory, said first memory being addressed for selecting a predetermined order of address locations in said second memory,

means for replacing the stored address locations in the first memory with the data in the addressed locations of said memory whereby the data stored in the second memory in a random order is reordered by addressing the address locations in the first memory in a predetermined order,



means for readdressing the previously addressed locations in the first memory for reading out the reordered data.

3,976,981

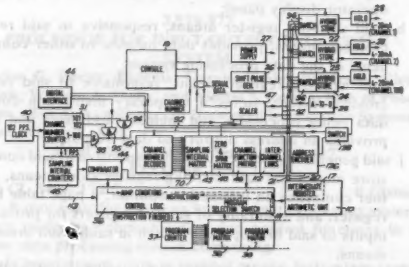
MULTI-CHANNEL CONTROL SYSTEMS

Keith Romilly Roskrudge Bowden, Bognor Regis, England, assignor to Rosemount Engineering Company Limited, Bognor Regis, England

Continuation-in-part of Ser. No. 120,170, March 2, 1971, abandoned. This application May 14, 1973, Ser. No. 360,126

Int. Cl.² G06F 3/05, 9/02

U.S. Cl. 340—172.5 **12 Claims**



1. In a control system having a plurality of separate control channels and a common means for processing data from all said channels in digital form, each channel having an input

line for receiving input analog information, an output line for output analog control signals, a digital store for storing input and output information, and converter means connected between said digital store and said input and output lines for converting analog and digital information to digital and analog information, respectively; sequencing means for connecting each of said control channels in sequence to said common data processing means, the data processing means including a multiplicity of control functions for use in processing said input information, the improvement comprising:

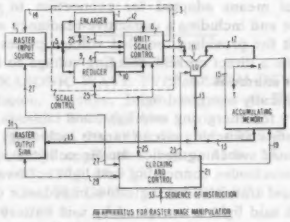
a channel function specification pin-board matrix having rows of input lines, columns of output lines, and socket means for interconnecting individual rows and columns, each of said rows of inputs corresponding to one of said channels and each of said columns corresponding to one of said control functions;

pin means manually insertable in selected ones of said sockets whereby said matrix is responsive to the connection of each of said channels to said common data processing means to cause the input data from the selected channel to be processed in accordance with the control function selected by said pin means.

3,976,982
APPARATUS FOR IMAGE MANIPULATION

Everett Truman Eiselen, Los Gatos, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed May 12, 1975, Ser. No. 576,931
Int. Cl.² G06F *15/20*
U.S. Cl. 340—172.5 **6 Claims**



1. An apparatus for manipulating a two-dimensional array of Boolean coded points, comprising:

memory means (15) for storing the array, said means including means (83, 85, 87) for selectively addressing linear subarrays in one of two directions and at an arbitrary starting address along either of the array dimensions;

means (17, 11, 13, 21, 19) for extracting the selectively addressed sequences from the memory and for replacing information at the same or other selectively addressed locations in the memory at a continuous rate;

a source (1) of Boolean coded information;

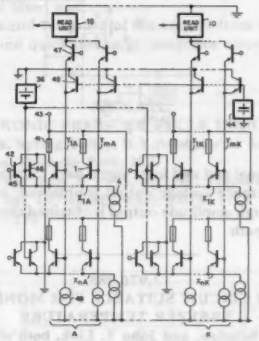
means (3, 6, 11, 17) for logically combining in serial fashion the linear subarrays extracted from the memory means with serial information from the source; and

control means (21, 23, 25, 19, 27, 29) for specifying the logical function performed by the combining means and for designating the addresses both for extracting data from the memory and for writing the logically combined sequences into the memory.

3,976,983
BIPOLAR PROGRAMMABLE READ ONLY MEMORY WITH FUSIBLE LINKS

Michel Moussie, Caen, France, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 11, 1975, Ser. No. 549,065
Claims priority, application France, Feb. 15, 1974, 74.05137; Oct. 25, 1974, 74.35842; Oct. 31, 1974, 74.36453
Int. Cl.² G11C *17/00*
U.S. Cl. 340—173 SP **8 Claims**



1. A programmable read-only memory comprising at least one row-column matrix of fusible link memory positions connected to row and column conductors, the columns being arranged in groups, each of said memory positions comprising a bipolar memory transistor, and a fuse connected in series with the collector electrode of said memory transistor, each of the emitters of said memory transistors of a row being connected directly to said respective row conductor, each of the bases of said memory transistors of a column being connected directly to said respective column conductor, and each of the collectors of a group of said memory transistors being connectable to a single voltage source via said respective fuse; column address means; difference detecting means;

reading means, including a read transistor whose emitter is connected directly to said corresponding column conductor, whose base is connected to said corresponding column address means, and whose collector is connected to said difference detecting means; and

a row-address transistor and row-address means, for each row, wherein each of said row conductors is connected to the emitter of said row-address transistor, the base of said row-address transistor being connected to said row-address means.

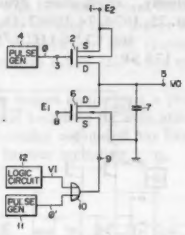
3,976,984
LEVEL SHIFTING CIRCUIT DEVICE

Masataka Hirasawa, Yokohama, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed May 19, 1975, Ser. No. 578,810
Int. Cl.² G11C *11/40, 13/00*
U.S. Cl. 340—173 R **19 Claims**

1. A level shifting circuit device comprising a first terminal connected to a high amplitude power source, an output terminal, a first conductive path formed between said first terminal and said output terminal which includes a first IG-FET of one conductive channel type whose first electrode is connected to said first terminal, means for applying a first pulse signal to said first IG-FET, a reference voltage input terminal, a second conductive path formed between said reference voltage input terminal and said output terminal so as to include a second IG-FET of the other conductive channel type, means for generating a second pulse signal of sepcified polarity substantially synchronized with said first pulse signal, and a circuit

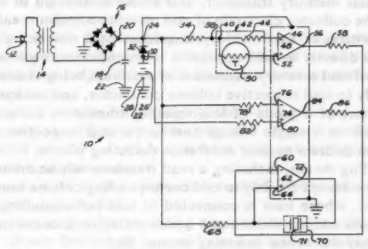
arrangement for rendering said second IG-FET conductive when said second pulse signal has coincided with a low amplitude logic signal from a logic circuit immediately preceding said level shifting circuit device, wherein only when said second pulse signal and said logic signal have coincided with each other, a reference voltage output is obtained; and except for said time a high amplitude output is obtained through said first conductive path.



3,976,985
ALARM CIRCUIT SUITABLE FOR MONITORING FREEZER TEMPERATURE

Rudolph D. Schalow, and John T. Link, both of Fort Wayne, Ind., assignors to Energystics Corporation, Fort Wayne, Ind.

Filed Apr. 17, 1975, Ser. No. 568,845
Int. Cl.² G08B 21/00
U.S. Cl. 340—228 R **1 Claim**

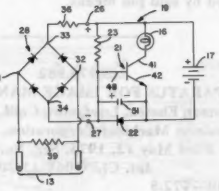


1. An Alarm Circuit comprising first control signal generating means for sensing a predetermined parameter and generating a first control signal variable between first and second states in response to a predetermined change therein, alarm signal generating means connected to said control signal generating means to receive said control signal and operable between idle and active states in response thereto, alarm means coupled to said alarm signal generating means for generating an audible alarm in response to said active state of said alarm signal generating means, power supply means including means for connecting same to a source of alternating current potential and a battery for supplying operating power to said circuit, means responsive to the absence of said alternating current potential for generating a second control signal variable between first and second states in response thereto, said alarm means being connected to said second control signal generating means and being operable between said idle and active states in response to said first and second states thereof, said second control signal generating means including a differencial current amplifier having an input terminal connected directly to said battery and a second input terminal connected to said battery through a diode, the voltage at said second terminal being greater than the voltage at said first terminal in the presence of said alternating current potential, the voltage at said first terminal being greater than the voltage at said second terminal in the absence of said alternating current potential, said second control signal generating means being operative into said active state when said voltage at said first terminal is greater than the voltage at said second terminal.

3,976,986
EMERGENCY LAMP AND SOLID STATE SWITCHING CIRCUIT THEREFOR

Stanley E. Zabroski, 910 N. "G" St., Oxnard, Calif. 93030

Continuation of Ser. No. 401,400, Sept. 27, 1973, abandoned. This application Dec. 20, 1974, Ser. No. 534,692
Int. Cl.² G08B 21/00
U.S. Cl. 340—253 C **4 Claims**



1. An emergency light for connection to a normally "on" alternating current electrical power source which source is subject to occasional power failure, comprising:

electrical means adapted for connection to said power source and including a capacitive-reactance and rectifier circuit for providing rectified voltage pulses to thereby provide a direct current charging voltage so long as said power source is "on";

an electrically energized light;

a battery for energizing said light; and

a solid state switching circuit means including,

a transistor switching device having collector, emitter and base electrodes connecting said light across said battery and said transistor having a low impedance condition in which said light is energized by said battery and a high impedance condition in which said light is substantially unenergized, and

a diode connected between said emitter and said base electrodes of said transistor switching device and a biasing impedance coupled between said base electrode and said collector electrode of said transistor switching device and said biasing impedance further coupled to said battery, whereby when said electrical power source is in the normally "on" condition, said diode is forward biased by said direct current battery charging voltage from said capacitive-reactance and rectifier circuit of said electrical means to cause said transistor switching device to assume said high impedance condition to thereby maintain said light substantially unenergized and when said electrical power source is not in the normally "on" condition, said diode is reverse biased by said battery to cause said transistor switching device to assume said low impedance condition to thereby maintain said light substantially energized, and

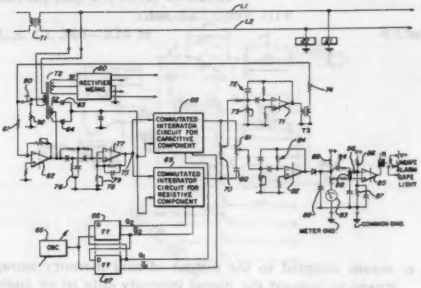
a capacitor connected in parallel with said diode between said emitter and said base electrodes of said transistor to prevent said transistor from changing to its low impedance state momentarily and repeatedly between rectified voltage pulses while said battery is being charged.

3,976,987

DUAL CHANNEL DYNAMIC LINE ISOLATION MONITOR

Ernest G. Anger, Wauwatosa, Wis., assignor to Square D Company, Park Ridge, Ill.

Filed Aug. 29, 1975, Ser. No. 609,002
Int. Cl.² G08B 21/00
U.S. Cl. 340—255 25 Claims



1. A monitor for use with an ungrounded power distribution system with conductor lines having impedance leakages comprising:

detector means for generating a reference voltage;

current means responsive to said reference voltage for applying a measurement current to said system;

feedback means connected to said system for determining the voltage response of said impedance leakages to said measurement current;

said feedback means connected to said current means for adjusting the phase and magnitude of said measurement current; and

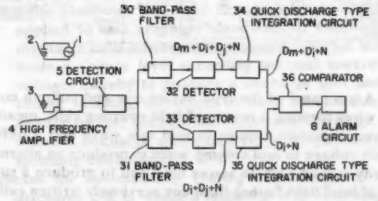
output means responsive to said current means for indicating the completeness of said system's isolation from ground.

3,976,988

ULTRASONIC WAVE TYPE ALARM DEVICE

Yukio Fujimoto, Yachiyo, Japan, assignor to URO Denshi Kogyo Kabushiki Kaisha, Japan

Filed Mar. 20, 1974, Ser. No. 452,917
Claims priority, application Japan, Mar. 23, 1973, 48-32624; Mar. 23, 1974, 48-32625
Int. Cl.² G08B 13/16; G01S 9/66
U.S. Cl. 340—258 A 7 Claims



1. In an ultrasonic alarm system of the type having an ultrasonic wave transmitter for transmitting ultrasonic waves through air; an ultrasonic wave receiver for receiving ultrasonic waves having Doppler effect frequency components; and a detector circuit for developing electrical Doppler frequency signals; the improvement which comprises:

a. a first bandpass filter receptive of the Doppler frequency signals developed by said detector circuit and having a narrow pass band effective to pass only Doppler frequency signals having frequencies characteristic of certain human motions;

b. a first quick discharge integrator circuit for integrating the output Doppler frequency signals from said first bandpass filter;

c. a second bandpass filter receptive of the Doppler frequency signals developed by said detector circuit and having a narrow pass band within the frequency band of said Doppler frequency signals and without the pass band of said first bandpass filter;

d. a second quick discharge integrator circuit for integrating the output Doppler frequency signals from said second bandpass filter; and

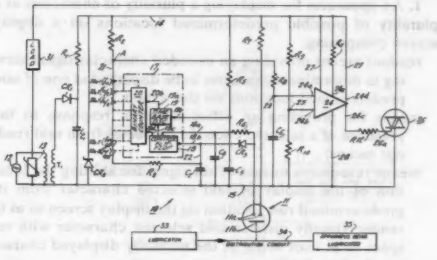
e. a comparator receptive of the outputs from said first and said second quick discharge integrator circuits.

3,976,989

ELECTRONIC PRESSURE CYCLE INDICATOR

Carl H. Smith, Spring Valley, N.Y., assignor to Auto Research Corporation, Rochelle Park, N.J.

Filed Mar. 3, 1975, Ser. No. 554,402
Int. Cl.² G08B 21/00; F01M 1/18
U.S. Cl. 340—270 4 Claims



1. Adjustable timing means for monitoring intervals between operations occurring in a cyclical periodic fashion to provide an alarm condition when the time period between successive operations is abnormally long comprising:

oscillator means for generating timing pulses at spaced intervals T;

N-stage binary counter means coupled to said oscillator means for accumulating pulses;

bistable control means for disabling said oscillator means and said counter means when in a first state and for enabling said oscillator means and said counter means when in a second state;

switch means being activated upon the occurrence of one of said operations to drive said control means to said second state and reset said counter means;

a power source and reference means coupled to said power source for establishing a predetermined threshold voltage;

logical gating means;

comparator means coupled to said gating means and said reference means for generating an output signal when the voltage across said output of said gating means exceeds said predetermined threshold;

alarm means coupled to said output of said comparator means for activation when said comparator means generates an output signal;

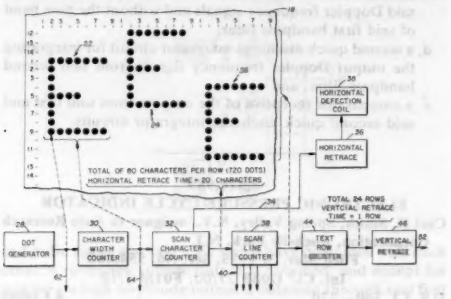
the outputs of selected stages of said counter means being coupled to said gating means to adjust the time interval T_T between driving of said control means to said second state and said generation of an output by said comparator means, wherein $T \leq T_T \leq (2^N-1)T$.

3,976,990

APPARATUS AND METHOD FOR OFFSETTING SELECTED CHARACTERS OF A CHARACTER DISPLAY

Gary R. Haak, Chicago, Ill., assignor to Teletype Corporation, Skokie, Ill.

Filed Dec. 20, 1974, Ser. No. 535,069
Int. Cl.² G06F 3/14
U.S. Cl. 340—324 AD 4 Claims



1. An apparatus for displaying a plurality of characters at a plurality of possible predetermined locations on a display screen comprising:

readout means providing an encoded character signal serving to determine a character to be displayed at one of said predetermined locations on the screen,

means for providing an offset signal in response to the presence of a selected encoded character from said readout means;

means responsive to said offset signal for shifting the location of the display of said selected character from its predetermined row location on the display screen so as to render visually distinct said selected character with respect to at least some of the normally displayed characters in the related row;

said display screen forming a portion of a cathode ray tube and the electron beam being in the form of a cathode ray beam impinging the screen of the cathode ray tube, a main vertical deflection coil having a predetermined inductance, the magnetic field of which controls said cathode ray beam during the generation of a character row upon the cathode ray tube screen; and

said character offset means including a minor vertical deflection coil having an inductance of a value less than said main vertical deflection coil inductance, said minor vertical deflection coil producing a second relatively constant magnetic field interacting with the magnetic field created by said main vertical deflection coil during the writing of said selected character so as to offset said selected character from its related row of corresponding characters.

3,976,991

BRIGHTNESS CONTROL AND COMPENSATION CIRCUITRY FOR CATHODE RAY TUBE DISPLAYS

Charles Wyndham Robinson Hickin, 812 Country Club Road, Binghamton, N.Y. 13903, and David Allen Smith, 2936 Northwood Drive, Endwell, N.Y. 13760

Filed Sept. 20, 1974, Ser. No. 507,595
Int. Cl.² G06F 3/14
U.S. Cl. 340—324 A 9 Claims

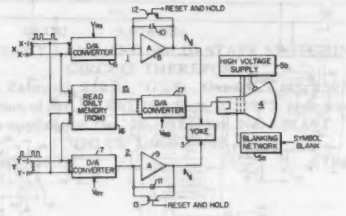
1. In a Beam Intensity Compensating System for a cathode ray tube display system, the combination comprising,

a. means responsive to digital coded signals representative of the X and Y coordinates of selected beam write rates to produce analog beam deflection signals to generate symbol or vector displays,

b. means to vary the intensity of the beam as a function of the write rates including,

c. memory storage means having digital data stored therein representing intensity compensation data for varying combinations of X and Y beam write rates said memory storage means being responsive to said digital X and Y write rate signals

d. means to apply digital X and Y write rate signals as an address to said memory to read out digital intensity compensating data from said memory in response to the particular combination of X and Y write rates,



e. means coupled to the output of said memory storage means to convert the digital intensity data to an analog intensity control signal,

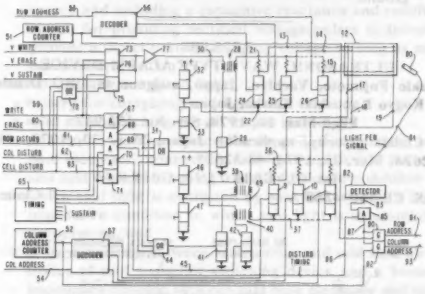
f. means to couple the intensity compensating signal to the beam generating means in a cathode ray tube to vary the intensity of the beam as the beam deflection varies to maintain the brightness of the generated display constant with varying beam write rates.

3,976,992

GAS DISPLAY PANEL WITH LIGHT PEN

Tony N. Criscimagna, Woodstock, and Michael J. Steinmetz, Hurley, both of N.Y., assignors to IBM Corporation, Armonk, N.Y.

Filed Jan. 3, 1975, Ser. No. 538,423
Int. Cl.² G06F 3/14
U.S. Cl. 340—324 M 7 Claims



1. A gas panel of the type having row and column coordinate wires forming a matrix of light emitting cells, means for applying a sustain voltage to said row wires and a different sustain voltage to said column wires to produce an alternating polarity sustain voltage across each cell to produce a succession of brief light flashes from any previously written cell, and means for addressing particular row and column wires for write and erase operations, the improvement comprising,

means for disturbing the timing of the leading edge of a sustain voltage of the cells of an addressed coordinate wire, whereby each previously written cell of the addressed coordinate produces a light flash at a time different from the light flash of other previously written cells, and

means including a light pen positionable at a cell of the array for detecting a light flash at the time of the leading edge of the disturbed sustain voltage and for signalling the address of the addressed coordinate.

3,976,993

GAS DISCHARGE PANEL SELF SHIFT DRIVE SYSTEM AND METHOD OF DRIVING

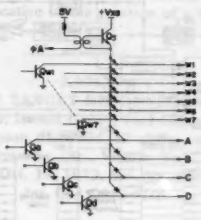
Tadatsugu Hirose; Toshinori Urade, both of Akashi, and Hisashi Yamaguchi, Kobe, all of Japan, assignors to Fujitsu Ltd., Japan

Filed July 12, 1974, Ser. No. 488,191

Claims priority, application Japan, July 16, 1973, 48-80120; July 23, 1973, 48-82855

Int. Cl.[2] G06F *3/14*

U.S. Cl. 340—324 M 8 Claims



1. A self shift drive system for a gas discharge panel having a first plurality of parallel, common electrodes having a common electrical connection thereto and a second plurality of parallel, shift electrodes disposed transversely to said common electrodes, each said plurality being covered by a dielectric layer and said layers being spaced to define a discharge space therebetween, the intersections of said first and second pluralities of electrodes defining respectively corresponding discharge cells, wherein a discharge in any given discharge cell establishes a wall charge on a corresponding portion of the dielectric layer associated with that discharge cell and produces a lowered firing voltage level for establishing a discharge in an adjacent cell, as defined by the next successive shift electrode and the same said common electrode, relatively to the firing voltage level thereof in the absence of any discharge in the said given discharge cell, comprising:

means for applying a voltage pulse of a first predetermined high voltage level to said common electrical connection for supplying correspnding high level voltage pulses in common to said plurality of common electrodes,

means for applying in succession to said plurality of parallel shift electrodes, a corresponding succession of low-level voltage pulses, each of a predetermined second voltage level lower in absolute voltage value and of opposite polarity relatively to said high level voltage pulse, and said second voltage level being selected so that when said second, low level voltage pulse is applied to a selected one of said shift electrodes, said second low-level voltage pulse combines with said first high-level voltage pulse applied to said common electrodes to establish in the discharge cells corresponding to said selected shift electrode a voltage level exceeding the said lowered firing voltage, thereby to produce a discharge spot and a wall charge resulting therefrom in each said discharge cell defined by said selected shift electrode discharge cell for which a discharge spot exists in the respectively corresponding discharge cell, and

means for automatically erasing a discharge of a given discharge cell in which a discharge was occurring, upon shifting of the discharge spot to a next successive discharge cell, by terminating said low level voltage pulse of said second level applied to the shift electrode associated with said given cell and continuing to apply said high level voltage pulses of said first level, the high level voltage pulses of said first level cooperating with the wall voltage exhibited by said wall charge of said given cell to produce an erasing discharge and maintain thereby a wall voltage having a value such that the impression of a voltage exceeding the normal firing voltage of said discharge cell is cancelled by said high voltage pulse, whereby a discharge spot in a given discharge cell defined between a given shift electrode and a corresponding common electrode is shifted to the next successive discharge cell defined by the next successive, selected shift electrode and the same common electrode by selective application of the successive low level voltage pulse of said second level to the corresponding, next successive shift electrode and is automatically erased from said given discharge cell defined by the said given shift electrode and said same, common electrode by termination of the low level voltage pulse applied to the said given shift electrode.

3,976,994

LIQUID CRYSTAL DISPLAY SYSTEM

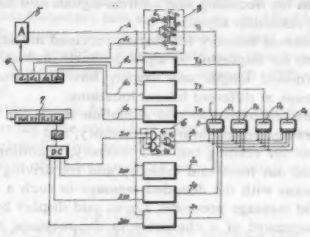
Isamu Washizuka, Kyoto, and Hirohide Nakagawa, Sakurai, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Oct. 15, 1974, Ser. No. 514,928

Claims priority, application Japan, Oct. 15, 1973, 48-116083

Int. Cl.[2] G06K *15/18*

U.S. Cl. 340—336 5 Claims



1. A liquid crystal display system comprising:

a plurality of liquid crystal display units for conjointly displaying a selected word in a predetermined word time period in response to display information signals applied to each display unit and representative of said selected word, said word time period being equal to the sum of the periods of first and second display cycles, said periods of each of said display cycles being equal to the time of one application of said display informaton signals to each of said display units, the optical characteristics of said display units changing state in response to the application of display information signals having voltages in excess of a predetermined threshold level;

means for generating said display information signals including, alternating voltage generating means for continuously applying an alternating voltage to said display units throughout the entire word time period, the voltages of said display information signals varying as a function of the amplitude of said alternating voltage, and means generating timing signals for causing said amplitude to exceed said threshold levels at selected times within said display cycles in accordance with the word to be displayed; and

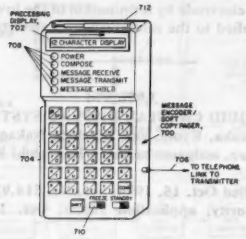
means for constraining said alternating voltage to a fist polarity in said first display cycle and to a second opposite polarity during a second display cycle.

3,976,995

PRECESSING DISPLAY PAGER

George Sebestyen, Weston, Mass., assignor to Sanders Associates, Inc., Nashua, N.H.

Filed May 22, 1975, Ser. No. 580,075
Int. Cl.² G09F 9/32
U.S. Cl. 340—337 22 Claims



1. A pager for displaying a message in alpha/numeric form comprising:

means for receiving address signals and coded message signals;

means for decoding said address-signals and for generating an actuation signal;

an internal memory for storing received message signals;

means for displaying an alpha/numeric message of a predetermined length said display having character display means at different lateral locations;

means responsive to said actuation signal for loading said message signals into said memory; and

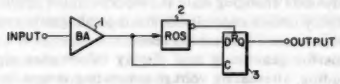
means for reading out said memory, decoding the signals read out from said memory and for driving said display means with the decoded message in such a manner that said message precesses across said display by lateral displacement of a character in the message a number of times to next adjacent character locations, so that the character moves across the display from one side of the display to the other side, whereby long messages for a predetermined recipient may be displayed on a limited length display in a personally portable unit.

3,976,996

CONVERSION OF FSK TO NRZ CODING

Chin Tao Wu, New Brunswick, N.J., assignor to RCA Corporation, New York, N.Y.

Filed June 4, 1975, Ser. No. 583,604
Int. Cl.² H03K 13/24
U.S. Cl. 340—347 DD 4 Claims



1. A system for converting frequency shift keyed input signals to non-return-to-zero output signals comprising the combination of:

timing means responsive to the input signals for producing a timing signal with a predetermined time duration; and

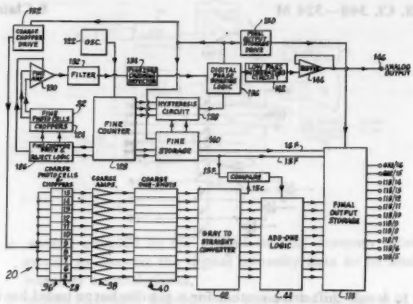
output means responsive to the input signals and to said timing signal for producing an output signal concurrent with said timing signal when an input signal occurs during the duration of the timing signal.

3,976,997

DIGITAL PLUS ANALOG OUTPUT ENCODER

Ralph S. Hafle, Benton, Ark., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed June 14, 1972, Ser. No. 262,596
Int. Cl.² H03K 13/02
U.S. Cl. 340—347 SY 27 Claims



1. An encoder,

comprising a movable code member,

a timing signal source,

modulating means for translating any movement of said code member into variations in the phase of a timing signal derived from said source,

synchronizing means for producing a sync signal derived from said source,

phase comparator means for producing phase comparator output pulses at a constant repetition rate and varying in width in accordance with the phase difference between said variable phase timing signal and said sync signal,

the width of said comparator pulses being a direct indication of the position of said code member,

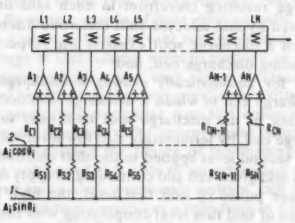
and analog output means for producing an analog output signal having a magnitude corresponding directly to the width of said comparator pulses whereby the magnitude of said output signal is a direct indication of the position of said code member.

3,976,998

SYNTHETIC APERTURE RADARS

Roger Voles, London, and Simon Watts, Esher, both of England, assignors to EMI Limited, Hayes, England

Filed June 6, 1974, Ser. No. 476,996
Claims priority, application United Kingdom, June 7, 1973, 27263/73
Int. Cl.² G01S 9/02
U.S. Cl. 343—5 CM 7 Claims



1. A processing arrangement, for a synthetic aperture radar, arranged to operate on phase quadrature components of each

of a sequence of signals, received by an aerial included in said radar, including

a. a shifting storage device having a plurality of inputs to which signals are applied for addition to signals input at earlier stages thereof before being shifted to later stages thereof to provide an output signal at a final stage, and

b. weighting circuits arranged to weight each of said components by respective factors to provide different weighted components of each received signal to each of said inputs at substantially the same time,

the weighting factors being such that, in response to successive received signals from said aerial, the said output signal is indicative of the position of a target in relation to said aerial.

3,976,999

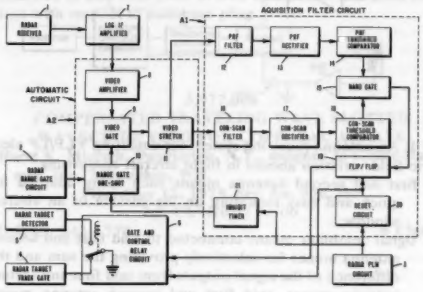
AIRBORNE TARGET RECOGNITION SYSTEM

Thomas A. Moore, Locust Grove; Earl Gehman, Fairfax, and George Huddleston, Herndon, all of Va., assignors to Vega Precision Laboratories, Inc., Vienna, Va.

Filed Oct. 19, 1973, Ser. No. 407,892

Int. Cl.² G01S 9/16

U.S. Cl. 343—7.3 **13 Claims**



1. A method for acquiring a target utilizing a conical scan radar system having a scan of a known pulse repetition frequency and a known scan frequency comprising directing the conical scan beam of said radar toward said target, setting a gate control relay to inhibit a track gate of said radar from locking onto a return signal prior to resetting, gating amplitude modulated video return signals from said target into a filter and comparator circuit, filtering the known conical scan frequency of said video return signal, comparing the conical scan filter output amplitude modulated signal to a known threshold, and resetting said control gate in response to said amplitude modulated scan frequency signal exceeding said known threshold to activate said radar track gate, thereby allowing said track gate to lock on said target.

3,977,000

MONOPULSE RADAR RECEIVER

Ronald A. Wagner, Hudson, Mass., assignor to Raytheon Company, Lexington, Mass.

Filed Nov. 4, 1974, Ser. No. 520,593

Int. Cl.² G01S 9/22

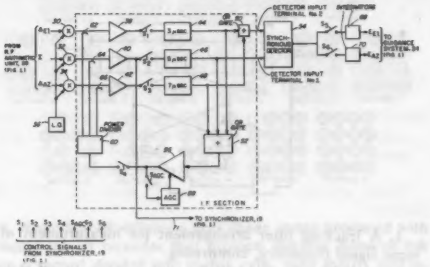
U.S. Cl. 343—16 M **6 Claims**

1. In a monopulse receiver wherein radio frequency signals from a source, such signals corresponding, respectively, to monopulse sum, elevation difference and azimuth difference signals are, in response to echo signals received from a target, simultaneously produced at different output terminals of a radio frequency arithmetic unit and then downshifted in frequency to form corresponding intermediate frequency sum, elevation and azimuth difference signals, an improved intermediate frequency receiver section comprising:

a. multiplexing means, including a first. second and third delay line imparting successively longer time delays, for converting the simultaneously formed intermediate frequency sum, elevation difference and azimuth difference signals into a triad of sequentially occurring signals;

b. intermediate frequency amplifying means, including a single amplifier, for amplifying each one of the triad of sequentially occurring signals; and

c. demultiplexing means for redirecting each separate one of each amplified triad of sequentially occurring signals through selected ones of the first, second and third delay



lines to form two sequentially occurring time coincident pairs of signals, one of such pairs being an amplified intermediate frequency sum signal and an amplified intermediate frequency elevation difference signal and the other being an amplified intermediate sum signal and an amplified intermediate frequency azimuth difference signal; and,

d. demodulation means for deriving, from the two sequentially occurring time coincident pairs of signals, a pair of error signals indicative, respectively, of the elevation and azimuth error of the source of the radio frequency signals.

3,977,001

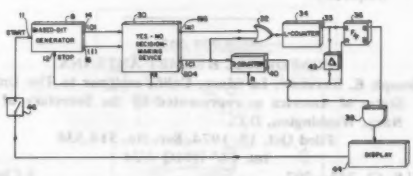
FRIEND-ACCEPT DECIDER TEST SIMULATOR

Walton B. Bishop, Oxon Hill, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 23, 1975, Ser. No. 580,431

Int. Cl.² G01S 7/40

U.S. Cl. 343—17.7 **10 Claims**



1. A system for testing, in a desired simulated decision-information environment, yes-no type decision-making devices utilizing binary information as a decisional basis comprising:

means for generating a biased-data information stream of binary 1's and 0's, wherein the ratio of said binary 1's and 0's is adjustable to a desired value and remains constant until readjusted, said binary ratio being related to the decision-information environment desired to be simulated, said means having an output adapted for coupling to the input of said decision device under test; and

means adapted for coupling to the output of said decision device for observing the number of "yes" decisions and the total number of "Yes + No" decisions made by said decision device.

3,977,002

TRACKING FILTER FOR FREQUENCY MEASUREMENT IN A DOPPLER TYPE NAVIGATION GUIDANCE SYSTEM OR THE LIKE

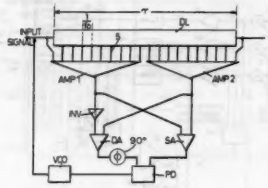
Paul Barton, Bishops Stortford, England, assignor to International Standard Electric Corporation, New York, N.Y.

Filed Feb. 6, 1975, Ser. No. 547,598

Claims priority, application United Kingdom, Feb. 12, 1974, 6280/74

Int. Cl.² G01S 1/40

U.S. Cl. 343—106 D **4 Claims**



1. A tracking filter arrangement for measurement of an input signal frequency, comprising:
- a variable frequency oscillator responsive to a control signal to set the frequency of said oscillator;
- sampling means responsive to said oscillator for sampling said input signal at the frequency rate of said oscillator;
- delay means responsive to the output of said sampling means, said delay means providing a plurality of taps substantially equally-spaced by $1/f_o$ and having an overall electrical length corresponding to a plurality of cycles of said input signal, where f_o is a nominal center frequency of response of said tracking filter;
- sum and difference means for generating separate signals representative of the sum and difference of signal amplitudes within first and second groups of contiguous taps;
- product detector means responsive to said separate sum and difference signals to generate an error signal of polarity depending upon whether said oscillator signal is higher or lower than said input signal;
- and means applying said error signal to said oscillator as said control signal in a sense to tend to adjust the frequency of said sampling to match said input signal frequency, whereby measurement of said oscillator frequency is tantamount to measurement of said input signal frequency.

3,977,003

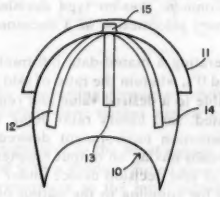
CONFORMAL HELMET ANTENNA

Joseph E. Kershaw, La Mesa, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 15, 1974, Ser. No. 514,334

Int. Cl.² H01Q 1/24

U.S. Cl. 343—702 **4 Claims**



1. In a non-metallic helmet, an antenna comprising:
- a metallic housing for enclosing transmitter-receiver electronics mounted on the exterior of said helmet;
- a plurality of elongated metallic fingers bonded to the outer surface of said helmet and conforming to the shape of said helmet;
- all of said fingers being physically connected at a single point adjacent to said housing and diverging outwardly therefrom, said fingers being operably coupled to said housing;
- whereby said housing and said fingers form a broad band radiating structure with mixed polarization.

3,977,004

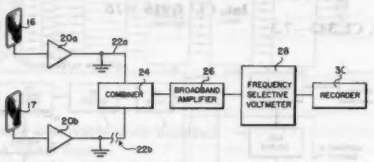
AIRCRAFT VLF/LF/MF WINDOW ANTENNA RECEIVING SYSTEM

John E. Bickel, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed June 16, 1975, Ser. No. 587,527

Int. Cl.² H01G 1/28

U.S. Cl. 343—705 **4 Claims**



1. An antenna receiving system for detecting VLF/LF electric field variation aboard in flight aircraft comprising:
- first and second antenna means each being adapted for quick and easy mounting on the surface of an aircraft window;
- signal combiner means connected to said first and second antenna means for selectively providing the sum and the difference of the signal outputs from said first and second antenna means, said first and second antenna means being symmetrically oriented such that said sum and said difference of the signal outputs are proportional, respectively, to the vertical and horizontal electric fields associated with the signals received by said first and second antenna means.

3,977,005

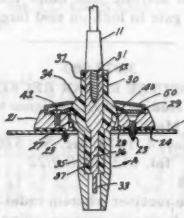
ANTENNA BASE ASSEMBLY

Joseph B. Cejka, Fair Haven, N.J., assignor to Ward Products Corporation, New Brunswick, N.J.

Filed Jan. 2, 1975, Ser. No. 538,015

Int. Cl.² H01Q 1/32, 1/20

U.S. Cl. 343—715 **5 Claims**



1. An antenna base assembly for mounting an antenna mast on a vehicle body panel comprising: a base plate with a top surface and a bottom surface, said base plate having means for rigidly affixing said base plate to the exterior side of said vehicle body panel, and having an aperture therethrough from said top surface through said bottom surface, the diameter of

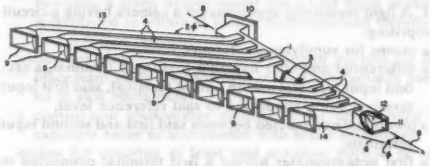
said aperture at said bottom surface being less than the diameter of said aperture at said top surface to form a ball seat; an enlongated generally cylindrical mast holder, said holder having means at its top end for attaching the lower end of said antenna mast, means at its lower end for attaching a radio cable, and a generally spherical enlarged portion between its top end and its bottom end having a diameter less than the diameter of said aperture at the top surface of said base plate and greater than the diameter of said aperture at the bottom surface of said base plate, the upper surface of said enlarged portion of said mast holder being a plastic material and said mast holder being received through said base plate aperture so that said enlarged portion is pivotably seated in said base plate aperture ball seat and said top end of said holder extends above the top surface of said base plate; and retaining means for locking said holder in a fixed position with respect to said base plate, said retaining means comprising a thin retaining plate with a generally central aperture sized so that said retaining plate fits over the top end of said mast holder and abuts said upper surface of said enlarged portion of said mast holder and means independent of said base plate affixing means for rigidly attaching said retaining plate to said base plate whereby said retaining plate frictionally engages said enlarged portion of said mast holder as said retaining plate is rigidly attached to said base plate to lock said holder in a fixed position with respect to said base plate.

3,977,006

COMPENSATED TRAVELING WAVE SLOTTED WAVEGUIDE FEED FOR COPHASAL ARRAYS

Horst K. Miersch, Douglaston, N.Y., assignor to Cutler-Hammer, Inc., Milwaukee, Wis.

Filed May 12, 1975, Ser. No. 576,260
Int. Cl.² H01Q 13/00
U.S. Cl. 343—778 **6 Claims**



1. A traveling wave slot feed structure for coupling a common feed port cophasally to an array of utilization elements, comprising:

a. a main waveguide adapted to be connected at one end to the common feed port,

b. a plurality of slots, one for each of the utilization elements, located at intervals along said waveguide and so disposed transversely thereof as to couple in like polarity to the interior of the waveguide, and

c. a plurality of branch waveguides, each coupled at one of its ends to one of said slots and adapted to be connected at the second of its ends to one of said elements,

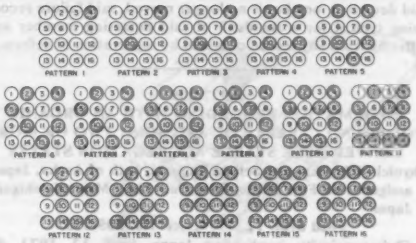
d. said branch waveguides having the same propagation velocity as a function of frequency as said main waveguide, and respective lengths such that the transmission paths between said feed port end of said main waveguide and said second ends of said branch waveguides are of equal lengths.

3,977,007

GRAY TONE GENERATION

James M. Berry, Deerfield; Anthony J. Hauser, Bellwood; Kurt E. Knuth, Mount Prospect, and Gary B. Ollendick, Chicago, all of Ill., assignors to Teletype Corporation, Skokie, Ill.

Filed June 2, 1975, Ser. No. 583,306
Int. Cl.² G01D 15/18
U.S. Cl. 346—1 **11 Claims**



1. A method of refining a gray shade image produced with a liquid ink-jet recorder that projects discrete drops of ink onto a record divided into matrix cells, each matrix cell including a plurality of dot locations;

depositing enough drops of liquid ink at each dot location of a matrix cell to produce approximately the requisite shade for that dot location within the matrix cell; and

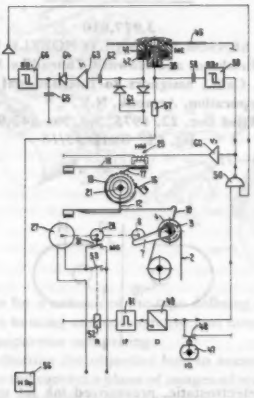
selectively adjusting the number of drops deposited at a dot location of the matrix cell area to refine the approximation to a more accurate half-tone representation of the image.

3,977,008

METHOD AND AN APPARATUS FOR DETECTING AND RECORDING THE NUMBER OF PHENOMENA

Paul Bommer, Breitenbach, Switzerland, assignor to Zumbach Electronic-Automatic, Orpund, Switzerland

Division of Ser. No. 347,320, April 6, 1973, Pat. No. 3,883,878. This application Dec. 16, 1974, Ser. No. 533,266
Claims priority, application Switzerland, Apr. 10, 1972, 5258/72
Int. Cl.² G01D 9/30
U.S. Cl. 346—1 **6 Claims**



1. A method for supervising the continuous production of a product, particularly of an insulated wire, wherein a recording element is moved in a direction transverse to the advanc-

ing direction of a recording tape by a number of unit steps equal to the number of defects detected on said product during a predetermined supervising period, whereby a record is obtained the total length of which in a direction transverse to the advancing direction of the recording tape corresponds to the number of defects detected, a detecting member for detecting defects of said product being continuously moved by said product passing through a detecting station, and a failure record being produced by said recording element whenever said detecting member is no longer moved, said failure record being typical for a standstill of said detecting member and differing from any record obtained by registration of defects.

3,977,009

INFORMATION RECORDING WITH AN ORGANIC COMPOUND CAPABLE OF ASSUMING TWO OR MORE CONVERTIBLE STABLE AGGREGATION STATES

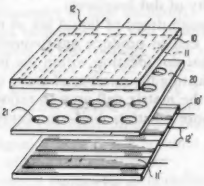
Shyuichi Ohtsuka, and Seiichi Taguchi, both of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Sept. 12, 1974, Ser. No. 505,293

Claims priority, application Japan, Sept. 12, 1973, 48-102213

Int. Cl.² G01D *15/10*; G11C *11/28*; H05B *37/00*

U.S. Cl. 346—74 R **15 Claims**



1. A recording method which comprises selectively applying an electric field to a layer of a recording medium on a support, the recording medium comprising at least one organic compound capable of assuming two or more convertible stable aggregation states at the same temperature, to selectively convert the initial aggregation state of the organic compound to which the field is applied into another aggregation state or hindering the converting of the initial aggregation state of the organic compound into another aggregation state and thereafter removing the electric field.

3,977,010

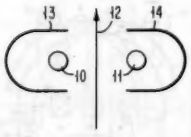
DUAL SENSOR FOR MULTI-NOZZLE INK JET

Byron Ted Erickson, and Howard Thorndike Hilton, both of San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 22, 1975, Ser. No. 642,885

Int. Cl.² G01D *15/18*

U.S. Cl. 346—75 **6 Claims**



1. In an electrostatic, pressurized ink jet system having a plurality of nozzles arranged in a row and projecting generally parallel ink streams in a predetermined direction, each of which breaks up into a stream of drops continuing in said direction, and having charge means for selectively applying an electrical charge to individual drops upon breakoff from each said stream, the improvement comprising:

two elongate electrically conductive sensing means disposed respectively on opposite sides of said drop streams, generally parallel to said row, and perpendicular to said streams;

electrically conductive shielding means disposed at least fore and aft of each said sensing means with respect to said direction of said drop streams, and closely spaced from and parallel to said sensing means; and

separate low impedance current amplification means connected to each said sensing means and grounded in common to said shielding means for amplifying current signals of said respective sensing means.

3,977,011

LIGHT MEASURING APPARATUS

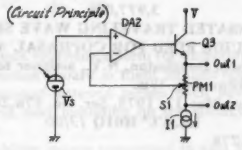
Motonobu Matsuda, Izumi, Japan, assignor to Minolta Camera Kabushiki Kaisha, Japan

Filed Mar. 6, 1975, Ser. No. 555,735

Claims priority, application Japan, Mar. 8, 1974, 49-27383

Int. Cl.² G03B *7/08*

U.S. Cl. 354—24 **14 Claims**



1. A light measuring apparatus for a camera having a circuit comprising:

a means for supplying a reference level;

a differential amplifier having a first input terminal, a second input terminal and an output terminal, said first input terminal being connected to said reference level;

a photodiode connected between said first and second input terminals;

a first potentiometer having a first terminal connected to said output terminal, a second terminal and a sliding terminal, said sliding terminal being slidable for setting exposure information;

a diode connected between said sliding terminal and said second input terminal for forming a negative-feed-back path to set the voltage between said first and second input terminals equal to zero whereby the voltage from said reference level to said sliding terminal is equal to the voltage across said diode which is proportional to the logarithm of the current generated by said photodiode and flowing through said diode; and

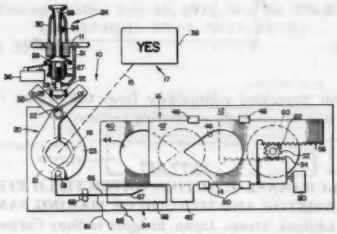
a first constant current feeding means for feeding said first potentiometer with a constant current to flow between said first and second terminals of said first potentiometer; the voltage from said sliding terminal to one of said first and second terminals of the first potentiometer being representative of the set exposure information making the voltage from said reference level to one of said first and second terminals of the first potentiometer equal to the voltage from said sliding terminal to said one of said first and second terminals of the first potentiometer added to the voltage from said reference level to said sliding terminal.

3,977,012

EXPOSURE CONTROL SYSTEM EMPLOYING A BLADE POSITION SENSOR

Irving Erlichman, Wayland, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Nov. 22, 1974, Ser. No. 526,391
Int. Cl.² G03B 7/14
U.S. Cl. 354—29 14 Claims



13. A photographic exposure control system for a camera, the camera having means for mounting photographic film at a given focal plane, and means for directing imagecarrying rays from a scene along a given optical path to the camera focal plane, said system comprising:

a blade mechanism operative for blocking and unblocking the optical path and for defining at least one aperture value in operative relation thereto, said blade mechanism including a blade member configured for displacement along a given blade path between one position in blocking relation to the optical path and other positions in unblocking relation thereto, said blade mechanism being configured for defining progressively changing aperture values as said blade member is displaced from said one position;

a sensor having at least an actuator portion, said sensor providng a given output signal when said blade member is displaced to within at least a predetermined vicinity of said actuator portion;

means for mounting at least said actuator portion for displacement along a sensor path at least substantially parallel to said blade path;

a comparison photometer configured for determining an exposure value in accordance with scene brightness;

means for coupling at least said actuator portion of said sensor means to said photometer so as to automatically position said actuator portion along said sensor path in accordance with the exposure value of said photometer; and

means for displacing said blade member along said blade path from its said first position toward its said other positions to initiate an exposure interval during which scene light is directed to the focal plane and then, in response to said given output signal, for displacing said blade member again into blocking relation to the optical path.

3,977,013

EVER-READY CAMERA CASE

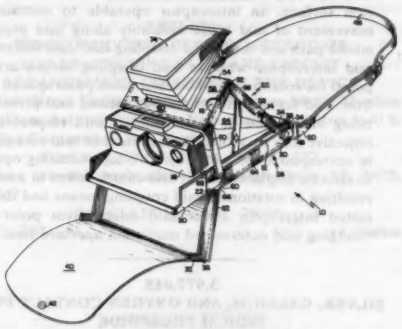
Thomas A. Svatek, Carlisle, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Sept. 26, 1974, Ser. No. 509,694
Int. Cl.² G03B 29/00
U.S. Cl. 354—75 10 Claims

7. Photographic apparatus comprising, in combination:

a photographic camera including first, second and third housing sections mounted for movement between a folded inoperative position wherein surfaces of said second and third housing sections are located in a common plane and an erected operative position wherein said surfaces of said second and third housing sections define an oblique angle therebetween; and

a carrying case including a first section adapted to receive said first housing sections; a second section including a first portion adapted to overlie said third housing section and a second portion adapted to overlie said second housing section when said camera is in said folded and



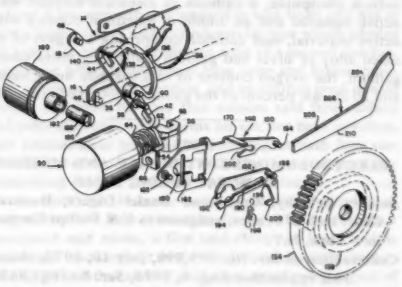
erected positions; means coupling said first and second sections for movement with said first, second and third housing sections between said folded and erected positions; and means on said second section for engagement with one of said first, second and third housing sections for preventing movement of said first and second portions toward said extended position when said second and third housing sections are in said folded position.

3,977,014

FOLLOW FOCUS EXPOSURE CONTROL SYSTEM WITH IMPROVED UNIFORM TRIM CONTROL

Philip R. Norris, North Reading, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Mar. 3, 1975, Ser. No. 554,771
Int. Cl.² G03B 9/02, 9/24
U.S. Cl. 354—196 20 Claims



1. Apparatus for a camera of the type defining a film plane and including a housing and an objective lens mounted on the housing, said apparatus comprising:

means for adjusting the objective lens to accommodate its focusing at the camera's plane of images of scenes located at different distances from the camera;

means for controlling the amount of scene light incident on the film plane, said scene light controlling means including a blade assembly movable along a predetermined path to define a range of apertures through which scene light must pass in reaching the film plane;

means responsive to the operation of said adjusting means for determining a maximum aperture size from said range of aperture sizes whereby said determined maximum aperture size corresponds to the distance a particular scene being photographed is positioned from the camera, said maximum aperture size determining means including a cam surface coupled to said lens adjusting means to be displaced in correspondence with the operation of said lens adjusting means, a cam follower in contact with said cam surface, an interceptor operable to restrain the movement of said blade assembly along said predetermined path and means for coupling said cam follower to said interceptor wherein said coupling means are disposed for rotation about a select pivot point spaced apart from said scene light controlling means, said pivot point being maintained in fixed relation with respect to the objective lens such that displacement of said cam surface in correspondence with objective lens focusing operates to effect a displacement of said cam follower in a manner resulting in rotation of said coupling means and its associated interceptor about said select pivot point thus changing said determined maximum aperture size.

3,977,015

SILVER, GALLIUM, AND OXYGEN CONTACT FOR INDIUM PHOSPHIDE

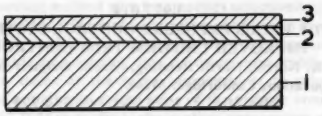
Leonard David Irving; James Edward Pattison, both of Malvern, and Huw David Rees, Malvern Link, all of England, assignors to British Secretary of State for Defence, London, England

Filed Mar. 31, 1975, Ser. No. 563,432

Claims priority, application United Kingdom, Mar. 29, 1974, 14166/74

Int. Cl.² H01L *29/46, 47/00*

U.S. Cl. 357—3 **6 Claims**



1. A transferred electron device comprising an active material formed of a semiconductor whose major constituent is indium phosphide, a cathode in electrical contact with said active material and an anode in electrical contact with said active material, said cathode comprising a region of an oxidized alloy of silver and gallium containing more silver than gallium, the oxygen content of said cathode being between 2 and 20 atomic percent of the gallium content of said cathode.

3,977,016

ELECTROLUMINESCENT DEVICE AND METHOD OF MANUFACTURING SAME

Jacques Lebailly, Caen, and Daniel Diguet, Herouville-St-Clair, both of France, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 377,890, July 10, 1973, abandoned. This application Aug. 4, 1975, Ser. No. 601,813

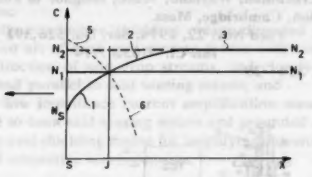
Claims priority, application France, July 12, 1972, 72.25286

Int. Cl.² H01L *33/00*

U.S. Cl. 357—17 **7 Claims**

1. An electroluminescent semiconductor device including a diode and a light emanating surface, comprising

first and second regions having subsantially uniform equal concentrations of doping centers of a first conductivity type and a concentration gradient of doping centers of a second opposite conductivity type, said first region adjoining said light emanating surface of said device and defining with said second region a *p-n* junction that constitutes said diode, wherein the concentration of said second conductivity type doping centers of said first



region decreases continously from the region of said junction to said light emanating surface.

3,977,017

MULTI-CHANNEL JUNCTION GATED FIELD EFFECT TRANSISTOR AND METHOD OF MAKING SAME

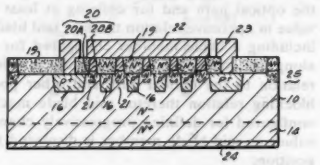
Akiyasu Ishitani, Atsugi, Japan, assignor to Sony Corporation, Tokyo, Japan

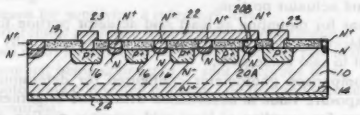
Continuation-in-part of Ser. No. 384,234, July 31, 1973, abandoned. This application Jan. 20, 1975, Ser. No. 542,377

Claims priority, application Japan, Apr. 25, 1973, 48-47445; Oct. 13, 1973, 48-115120

Int. Cl.² H01L *29/80*

U.S. Cl. 357—22 **7 Claims**





1. A multi-channel junction gated field effect transistor comprising a substrate of semiconductor material of relatively low impurity concentration of a first conductivity type, a mosaic shape semiconductor gate region of the opposite conductivity type formed in said substrate below one major surface thereof, the mosaic shape of said gate region forming a plurality of windows filled with portions of said substrate which provide channels for said field effect transistor, the main body portion of said substrate providing the drain for said field effect transistor, a corresponding relatively thick mosaic shape insulating layer overlying said mosaic shape gate region having a plurality of windows smaller than said windows of said gate region of the same configuration and aligned with said windows of said gate region, a first source region heavily doped with impurities the first impurity type completely within said windows of said insulating layer extending down from the outer surface of said insulating layer to a point short of the bottom of said windows of said insulating layer, a second source region extending down from at least one of said first source regions and being less heavily doped than said first source region but more heavily doped than said substrate and of said first impurity type doping, said second source region being partially within a window of said insulating layer and

extending down below said window of said insulating layer partially into a channel.

3,977,018

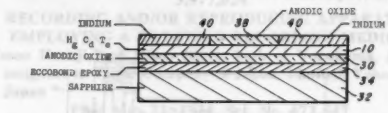
PASSIVATION OF MERCURY CADMIUM TELLURIDE SEMICONDUCTOR SURFACES BY ANODIC OXIDATION

Philip C. Catagnus, Richardson, and Charles T. Baker, Dallas, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 312,096, Dec. 4, 1972, abandoned. This application July 16, 1975, Ser. No. 596,331

Int. Cl.² H01L 27/14, 29/34, 29/161

U.S. Cl. 357—30 9 Claims



1. A semiconductor infrared detector operative in the photoconductive mode comprising:

a. a slab of junctionless semiconductor material having opposing major surfaces;

b. an anodized surface formed on at least one of the opposing major surfaces of the slab of junctionless semiconductor material for repelling minority carriers to reduce substantially surface recombination of minority carriers formed by incident light impinging on the slab; and

c. ohmic contacts affixed to the slab of junctionless semiconductor material in a spaced relationship one to the other whereby incident light falling on a major surface of the slab of junctionless semiconductor material generates carriers which recombine at the ohmic contacts to increase conductivity and gain.

3,977,019

SEMICONDUCTOR INTEGRATED CIRCUIT

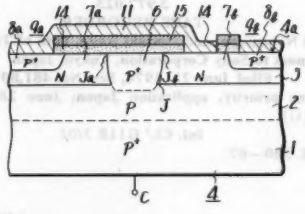
Takeshi Matsushita, Sagamihara, and Yoshiyuki Kawana, Atsugi, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed May 14, 1974, Ser. No. 469,841

Claims priority, application Japan, May 14, 1973, 48-53432

Int. Cl.² H01L 27/04, 27/02, 29/34, 29/04

U.S. Cl. 357—48 4 Claims



1. A semiconductor integrated circuit comprising:

a. a substrate of first conductivity type;

b. a first island region of second conductivity type formed on said substrate and having a first voltage potential applied thereto;

c. a second island region of second conductivity type formed on said substrate and having a second voltage potential applied thereto;

d. an isolation region of first conductivity type between said first and second regions and having first and second interfaces therewith, first and second PN junctions being formed by said first and second interfaces, respectively; and

e. a polycrystalline resistance layer doped to achieve a predetermined resistance sufficient to suppress formation of a reverse region in the isolation region, said resistance region being continuously formed in contact with said first and second island regions, isolation region, and first and second PN junctions to create a voltage gradient across said resistance layer due to said first and second voltage potentials.

3,977,020

SEMICONDUCTOR DEVICE, METHOD OF MANUFACTURING SAME AND CIRCUIT ARRANGEMENT COMPRISING THE DEVICE

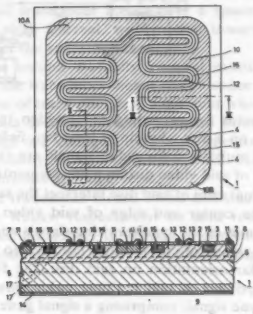
Theodoor Henri Enzlin, and Walter Henricus Maria Magdala Smulders, both of Nijmegen, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 29, 1974, Ser. No. 501,677

Claims priority, application Netherlands, Sept. 12, 1973, 7312547

Int. Cl.² H01L 27/02, 29/06

U.S. Cl. 357—51 14 Claims



1. A semiconductor device comprising:

a. a wafer-shaped semiconductor body having a first surface;

b. an electrically insulating layer which at least partly covers said first surface;

c. at least a transistor that is located in said body and has at least a base zone of a first conductivity type which adjoins the said first surface, a collector zone of a second conductivity type which adjoins said base zone and forms therewith a collector-base junction, and an emitter zone of said second conductivity type that adjoins said first surface and with said base zone forms an emitter-base junction, said emitter-base junction terminating at said first surface, said emitter zone and said base zone respectively comprising emitter and base contact surfaces;

d. emitter and base electrode layers respectively disposed at said emitter and base contact surfaces and adjoining their associated said zones, a first said electrode layer and its associated said contact surface substantially entirely surrounding the other one of said electrode layers, a part of said first surface being located between the inner edge of one of said contact surfaces and the oppositely located edge of other said contact surface that is associated with the second said electrode layer, there being present above said first surface part at most electrode layers which are connected to the semiconductor surface; and

e. at least a further region which substantially entirely surrounds said other contact surface and is separated from said emitter zone by a part of said base zone, said further zone being without any direct electrical connection and forming a distributed base resistor, said further zone being disposed in said base zone at said part of said semi-

conductor surface along substantially the whole length of the emitter-base junction.

3,977,021

COLOR VIDEO DISC, APPARATUS FOR MAKING THE SAME AND REPRODUCING APPARATUS THEREFOR

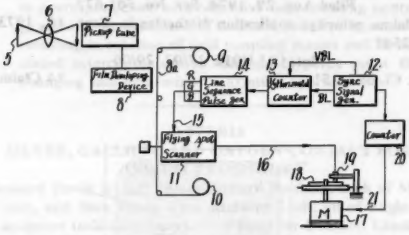
Yoshikazu Kobayashi, and Masachika Harada, both of Kawasaki, Japan, assignors to Nippon Columbia Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 21, 1974, Ser. No. 434,806

Claims priority, application Japan, Jan. 25, 1973, 48-10550; Jan. 25, 1973, 48-10551

Int. Cl.[2] H04N 5/76; H04L 7/00; H04N 9/44

U.S. Cl. 358—4 3 Claims



1. Apparatus for recording color video information in a spiral track on a disc wherein at least two field synchronizing signals and multiple color video signals are recorded on said spiral track of said video disc in a line sequential manner such that individual radii of said disc intersect the same type signals between the center and edge of said video disc such that individual ones of the synchronizing signals and the individual color video signals of said multiple color video signals have the same angular orientation on said disc, the first color video signal component of said multiple color video signals being used as a sync signal, comprising a signal generator means for producing said synchronizing signals, a ½ counter means for receiving said snchronizing signals and counting down said synchronizing signal by ½, a generator means receiving said counted down synchronizing signals and producing line sequency pulse signals, a flying spot scanner receiving and using said line sequence pulse signals as sampling pulses with for said color video signals and a cutting means receiving the output of said flying spot scanner for cutting said color video disc.

3,977,022

CATHODE-RAY TUBE IMAGE PRESENTATION SYSTEM OF THE INDEXING TYPE AND TIMING SYSTEM USEFUL THEREWITH

David E. Sunstein, 464 Conshohocken State Road, Bala Cynwyd, Pa. 19004

Filed Jan. 3, 1972, Ser. No. 214,888

Int. Cl.[2] H04N 9/24

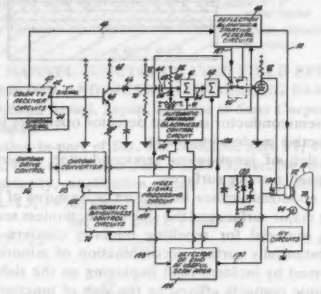
U.S. Cl. 358—67 51 Claims

4. In an electronic image-display system of the class employing an image-display device responsive to an image-representing light-control signal derived from input signals for producing a viewable image in a predetermined image area of said device by controlled sequential actuation of successive portions of said image area by a scanning entity and having running index elements dispersed at specific locations in said image area for producing an index signal indicative of the times of actuation of said successive portions by said scanning entity, said index signal varying in strength in response to variations in the strength of said light-control signal and having a tendency under some conditions to fall below a predetermined minimum acceptable level:

means responsive to said scanning entity for producing an index signal-strength monitoring signal which varies with said index signal strength during said scanning of said image area;

first means for sensing said monitoring signal selectively when darker portions of said image are being actuated and for producing a control signal therefrom representative of the strength of said index signal during said actuation of said darker image portions; and

second means responsive to said control signal for shifting the D.C. level of said light-control signal to oppose tendencies for said index signal strength to fall below said minimum acceptable level during said actuation of said darker portions of said image;



said light-control signal comprising recurrent first signal intervals during which it produces a visual image, and recurrent second signal intervals during which it is non-representative of said visual image, and in which said sensing means is responsive to said monitoring signal during at least a portion of said first signal intervals;

said image-display device comprising a cathode-ray tube having screen means scanned horizontally by the cathode-ray beam in the pattern of a television raster, said beam overscanning beyond said index elements in the latter portions of most of said first signal intervals, said apparatus comprising means for sensing the beginning of each of said overscannings and for initiating blanking of said beam at such times.

3,977,023

TAPE RECORDER

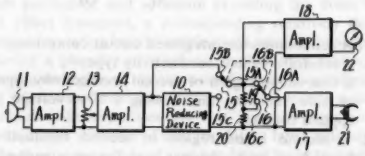
Shoichi Nakamura, and Noriaki Naito, both of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed June 21, 1974, Ser. No. 481,807

Claims priority, application Japan, June 28, 1973, 48-76795[U]

Int. Cl.[2] G11B 5/02

U.S. Cl. 360—67 8 Claims



1. An amplifying system for tape apparatus, said system comprising: a noise reducing device that compresses signals to be recorded, the amount of compression being a function of signal frequency such as to be different for higher frequencies than for frequencies below a predetermined value, whereby

output signals of the noise reducing device are favorably modified, in comparison w'th input signals to that device, for minimizing the effects of subsequently-introduced noise signals; a first switch connected to said noise reducing device and having a first condition to receive signals modified by said noise reducing device and a second condition to receive signals not modified by said noise reducing device; a second switch ganged with said first switch and having first and second conditions; and signal level modifying means connected to said second switch and energized by the output signal of said first switch and operative to change the output level of the signal from said second switch by xdB when both of said switches are in their first condition relative to the output when said switches are in their second condition.

3,977,024

RECORDING AND/OR REPRODUCING APPARATUS EMPLOYING A ROTATING RECORDING MEDIUM

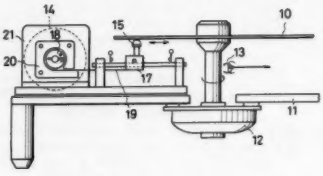
Yasuo Haneji, and Hisao Kinjo, both of Yokohama, Japan, assignors to Victor Company of Japan, Limited, Yokohama, Japan

Filed May 23, 1974, Ser. No. 472,547

Claims priority, application Japan, May 24, 1973, 48-57133; Oct. 31, 1973, 48-121797

Int. Cl.[2] G11B *21/10, 21/08;* **G05B** *19/40*

U.S. Cl. 360—78 **4 Claims**



1. A recording and/or reproducing apparatus of the type using a rotating recording medium, said apparatus comprising:

a recording medium, a transducer, and means for rotating said medium at a predetermined speed;

means for mounting said transducer to trace predetermined tracks over the rotating recording medium to record or reproduce signals;

means comprising a multi-phase excitation pulse motor having a plurality of stator windings and on associated rotor for operating intermittently;

means responsive to the operation of said pulse motor means for moving the transducer means intermittently, either toward the inner periphery of the recording medium or toward the outer periphery of the recording medium;

means for supplying first mutually unequal exciting currents, in a predetermined sequence, through the stator windings to intermittently rotate the rotor of the pulse motor in a forward direction, each forward rotation of said rotor moving said transducer means over a space equal to a two-track pitch interval, with motion toward the inner periphery of the rotating recording medium; and

means for thereafter successively supplying second mutually unequal excitation currents, in a sequence which is reverse to said predetermined sequence, through the stator windings to intermittently rotate the rotor in the reverse direction, each reverse rotation of said rotor moving said transducer means over a space equal to a two-track pitch interval, with motion toward the outer periphery of the recording medium,

said first and second mutually unequal exciting currents displacing the transducer means over a space equal to an odd-number of track pitches at a moment when the mutually unequala exciting currents supplied through the stator windings are changed over from the first mutually unequal exciting currents to the second mutually unequal exciting currents and vice versa;

whereby said transducer means forms and traces alternate concentric tracks, respectively, on said recording medium as said transducer is stepped intermittently toward the inner and outer periphery of said recording medium.

DESIGN PATENTS

GRANTED AUGUST 24, 1976

ERRATA

For CLASS	See PATENT NO.
025–074	241,104
016–059	241,165
016–059	241,166
016–006	241,167
016–006	241,168

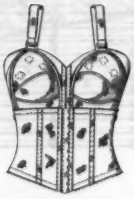
DESIGNS

AUGUST 24, 1976

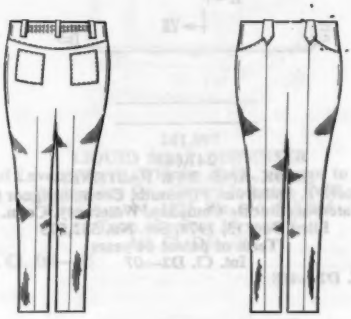
241,083
EXTRUDED FROZEN POTATO PRODUCT
Jerry L. Sloan, Portland, Oreg., assignor to Amfac Foods, Inc., doing business as Lamb-Weston, Portland, Oreg.
Filed Apr. 24, 1975, Ser. No. 571,360
Term of patent 14 years
Int. Cl. D1—*01*
U.S. Cl. D1—2

241,084
COMBINED PANTY GIRDLE AND WAIST CINCHER
Lee R. Smith, Montclair, N.J., assignor to Lido Foundations International, Inc., New York, N.Y.
Filed Jan. 2, 1975, Ser. No. 537,926
Term of patent 14 years
Int. Cl. D2—*01*
U.S. Cl. D2—4

241,085
COMBINED BRASSIERE AND MIDRIFF CINCHER
Lee R. Smith, Montclair, N.J., assignor to Lido Foundations International, Inc., New York, N.Y.
Filed Mar. 20, 1975, Ser. No. 560,484
Term of patent 14 years
Int. Cl. D2—*01*
U.S. Cl. D2—24



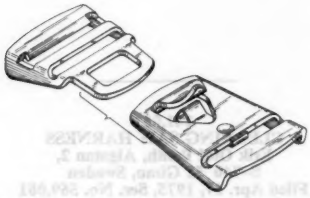
241,086
WOMEN'S JEAN
George M. Hattori, Denver, Colo., assignor to The Prior Co., Denver, Colo.
Filed Sept. 9, 1974, Ser. No. 504,513
Term of patent 14 years
Int. Cl. D2—*02*
U.S. Cl. D2—28



241,087
CLEARING SAW HARNESS
Erik Olof Panth, Algatan 2, S–740 52 Gimo, Sweden
Filed Apr. 17, 1975, Ser. No. 569,081
Claims priority, application Sweden Oct. 24, 1974
Term of patent 14 years
Int. Cl. D2—*07*
U.S. Cl. D2—400

241,088
FASTENER FITTING OR SIMILAR ARTICLE
Sigurd Walter Bengtsson, Bruksgatan 17, 414 51 Goteborg, Sweden
Filed Dec. 11, 1974, Ser. No. 531,705
Claims priority, application Sweden June 12, 1974
Term of patent 14 years
Int. Cl. D2—*07*
U.S. Cl. D2—409

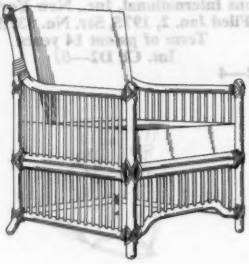
241,089
HOOK AND EYE FASTENER
Gustave T. Stafstrom, Plymouth, Conn., assignor to Waterbury Buckle Company, Waterbury, Conn.
Filed Dec. 13, 1974, Ser. No. 532,505
Term of patent 14 years
Int. Cl. D2—*07*
U.S. Cl. D2—418



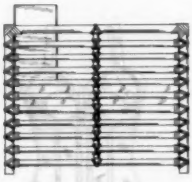
241,090
BELT BUCKLE
Furnie Deaver, P.O. Box 254, Bladenboro, N.C. 28320
Filed Feb. 18, 1975, Ser. No. 550,510
Term of patent 14 years
Int. Cl. D2—*07*
U.S. Cl. D2—427

241,091
DISH WASHING BRUSH
Tom Ahlstrom and Hans Ehrich, Stockholm, Sweden, assignors to A/S Jordan Borste & Penselfabrik, Oslo, Norway
Filed Mar. 6, 1975, Ser. No. 556,182
Claims priority, application Norway Sept. 9, 1974
Term of patent 14 years
Int. Cl. D4—*01*
U.S. Cl. D4—31

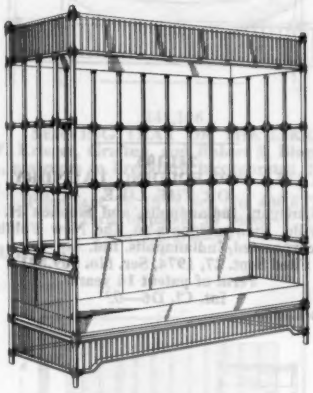
241,092
ARM CHAIR
Henry Olko, Applegreen Drive, Old Westbury, N.Y. 11568
Filed Aug. 20, 1974, Ser. No. 499,017
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—51



241,093
ARM CHAIR
Henry Olko, Applegreen Drive, Old Westbury, N.Y. 11568
Filed Aug. 23, 1974, Ser. No. 499,981
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—57

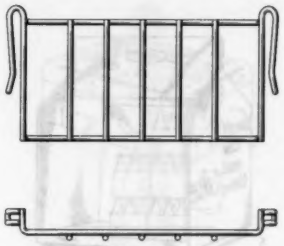


241,094
DAY BED WITH CANOPY
Henry Olko, Applegreen Drive, Old Westbury, N.Y. 11568
Filed Aug. 23, 1974, Ser. No. 499,979
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—59

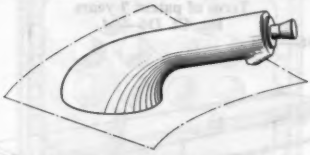


241,095
SEAT
Ira S. Friedman, Somerset, N.J., assignor to Rowe Furniture Corporation
Filed July 3, 1975, Ser. No. 593,060
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—63

241,096
DIVIDER FOR A DISPLAY CONTAINER
James C. Macklem, Coldwater, Mich., assignor to Syndicate Glass Incorporated, Indianapolis, Ind.
Filed Mar. 14, 1975, Ser. No. 558,231
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D6—85

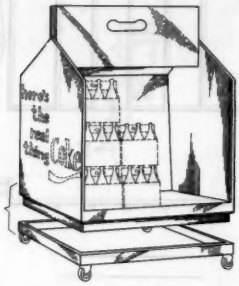


241,097
LIQUID SOAP DISPENSER
Earl Lavern Morris, Whittier, Calif., assignor to Acorn Engineering Co., City of Industry, Calif.
Filed Apr. 14, 1975, Ser. No. 568,035
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—95

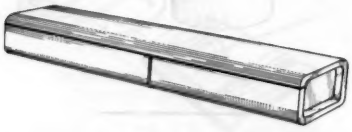


241,098
HANGING SUPPORT FOR FLOWER POTS
Steven L. Durfee and Susan K. Durfee, 326 Arnot Ave., Victoria, British Columbia, Canada V9A 2H4
Filed Aug. 26, 1975, Ser. No. 607,882
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—113

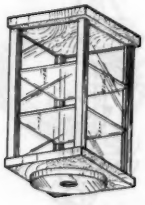
241,099
COMBINED DISPLAY UNIT AND DOLLY THEREFOR
Charles L. Davis, Atlanta, Ga., assignor to The Coca-Cola Company, Atlanta, Ga.
Filed Sept. 10, 1975, Ser. No. 612,120
Term of patent 14 years
Int. Cl. D9—*03;* D12—*02;* D20—*02*
U.S. Cl. D6—154



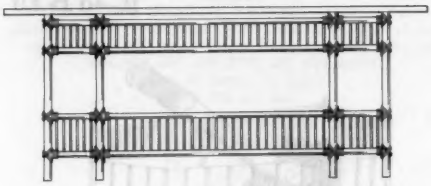
241,100
WALL MOUNTED SHELF WITH DRAWERS
Guy Vrignaud, Grenoble, France, assignor to Allibert Exploitation Societe Anonyme, Puteaux, France
Filed June 21, 1974, Ser. No. 481,861
Claims priority, application France Dec. 21, 1973
Term of patent 7 years
Int. Cl. D6—*04*
U.S. Cl. D6—159



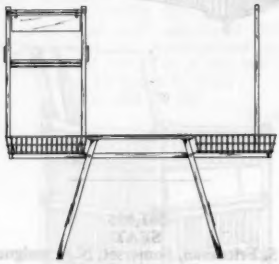
241,101
DISPLAY CASE
Bertram H. Kapnek, Wyndmoor, Pa.
(8106 Douglas Road., Philadelphia, Pa. 19118)
Original design application Oct. 4, 1973, Ser. No. 403,699, now Patent No. 236,784. Divided and this application Apr. 18, 1975, Ser. No. 569,413
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—168



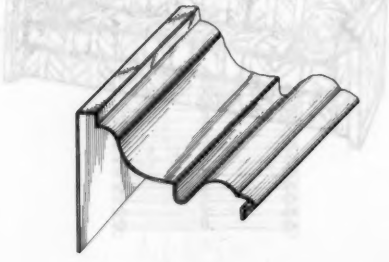
241,102
WORK TABLE
Henry Olko, Applegreen Drive, Old Westbury, N.Y. 11568
Filed Aug. 23, 1974, Ser. No. 499,980
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—175



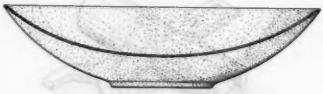
241,103
TABLE FOR FOLDING LAUNDRY OR THE LIKE
John B. Lanagan, Indianapolis, and Stephen H. Tilson, Noblesville, Ind., assignors to The New Folding System, Incorporated, Indianapolis, Ind.
Filed Sept. 27, 1974, Ser. No. 509,891
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—179



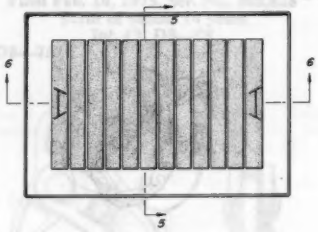
241,104
FRAME MOLDING
Greg Copeland, 114 Beach Terrace, Wayne, N.J. 07470
Filed Nov. 22, 1974, Ser. No. 526,293
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—74



241,105
FOOD BOWL
John F. Krieger, Grafton, and Robert S. Block, Bayside, Wis., assignors to Breakthru Incorporated, Milwaukee, Wis.
Filed Sept. 26, 1973, Ser. No. 400,878
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—1

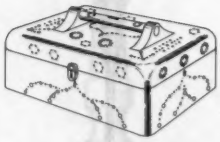


241,106
SERVING TRAY OR THE LIKE
John F. Krieger, Grafton, and Robert S. Block, Bayside, Wis., assignors to Breakthru Incorporated, Milwaukee, Wis.
Filed Sept. 26, 1973, Ser. No. 400,877
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D7—37

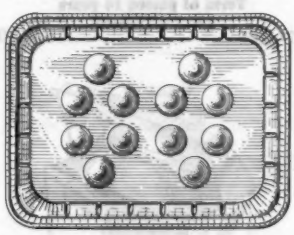


241,107
COMBINED SPICE HOLDERS AND WALLED MOUNTED RACK
Daniel A. Ferrara, Jr., New Milford, Conn., and Barry P. Benedek, New York, N.Y., assignors to Ferrara Benedek Design, Inc., New York, N.Y.
Filed Jan. 8, 1975, Ser. No. 539,467
Term of patent 14 years
Int. Cl. D7—*06*
U.S. Cl. D7—52

241,108
ELECTRICALLY HEATED LUNCH BOX
Daniel L. Macha, 3119 Moor Drive, Nederland, Tex. 77627
Filed Dec. 30, 1974, Ser. No. 537,553
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D7—76



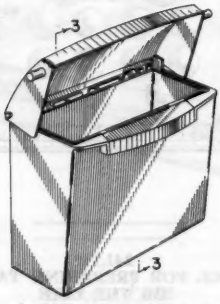
241,109
ROASTING PAN
Myron M. Levin, Highland Park, Ill., assignor to E-Z Por Corporation, Niles, Ill.
Filed Mar. 26, 1975, Ser. No. 562,224
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—85



241,110
TOOL FOR PREPARING TACOS OR THE LIKE
Gary A. Oedekerk, 6516 Glorywhite St., Lakewood, Calif. 90713
Filed Feb. 24, 1975, Ser. No. 552,273
Term of patent 14 years
Int. Cl. D7—*04*
U.S. Cl. D7—99

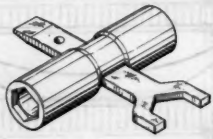
241,111
SPOON OR SIMILAR ARTICLE
Ellen B. Manderfield, Syracuse, N.Y., assignor to Oneida Ltd., Oneida, N.Y.
Filed Aug. 23, 1974, Ser. No. 500,060
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—137

241,112
COVERED WASTE RECEPTACLE
William B. Raftery, Winchester, Va., assignor to Rubbermaid Commercial Products, Inc., Winchester, Va.
Filed Apr. 28, 1975, Ser. No. 572,347
Term of patent 14 years
Int. Cl. D7—*07*
U.S. Cl. D7—194

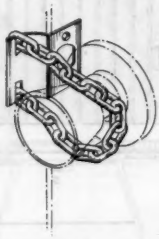


241,113
RACK FOR DRYING CLOTHES AND THE LIKE
William B. Lane, West Covina, and William J. Hennessy, Arcadia, Calif., assignors to Deccofelt Corporation, Glendora, Calif.
Filed Nov. 11, 1974, Ser. No. 522,924
Term of patent 14 years
Int. Cl. D7—*05*
U.S. Cl. D7—196

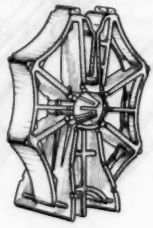
241,114
WRENCH FOR USE WITH SKATEBOARDS
Albert J. Hess, Santa Ana, Calif.
(8837 Brookdale Drive, Garden Grove, Calif. 92644)
Filed July 7, 1975, Ser. No. 593,262
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—26



241,115
SECURITY LATCH
Joseph A. La Barber, Bakersfield, Calif., assignor of a fractional part interest to Stanley Kiespert, Newport Beach, Calif.
Filed Feb. 20, 1975, Ser. No. 551,437
Term of patent 14 years
Int. Cl. D8—*07*
U.S. Cl. D8—131

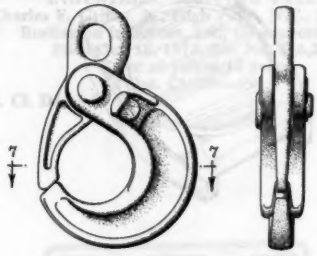


241,116
SPACER FOR REINFORCED CONCRETE
Ferdinand William Berry, 108 Woodland Drive, Hove 4, Sussex, England
Filed Mar. 31, 1975, Ser. No. 563,656
Claims priority, application Great Britain Oct. 3, 1974
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—228



241,117
SUPPORT FOR A HANGING FLOWER POT OR THE LIKE
Leonard Holtz, Oceanside, N.Y., assignor to Turn-Up, Inc., Oceanside, N.Y.
Filed Dec. 19, 1974, Ser. No. 534,563
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—246

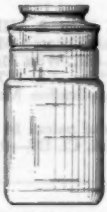
241,118
SAFETY HOOK
Kenneth D. Schreyer, Clarence, Otmar M. Ulbing, Webster, and Soma M. Rohosy, Hartland, N.Y., assignors to Columbus McKinnon Corporation, Tonawanda, N.Y.
Filed Feb. 10, 1975, Ser. No. 548,626
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—252



241,119
CEILING HOOK
Mary S. Emminger, 95 Cayuga St., Seneca Falls, N.Y. 13148
Filed Oct. 31, 1975, Ser. No. 627,541
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—253

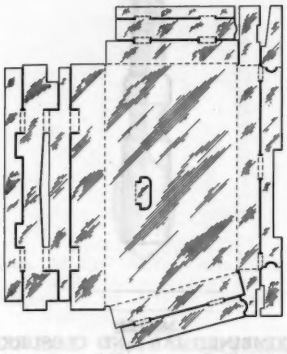
241,120
BOTTLE OR SIMILAR ARTICLE
Evert Jan Dekker, Voorburg, Netherlands, assignor to Indola Cosmetics B.V., Rijswijk, Netherlands
Filed Feb. 4, 1975, Ser. No. 546,891
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—155

241,121
COMBINED JAR AND CLOSURE
Floyd E. Pettengill, Lancaster, Ohio, assignor to General Foods Corporation, White Plains, N.Y.
Filed Apr. 14, 1975, Ser. No. 567,463
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—157

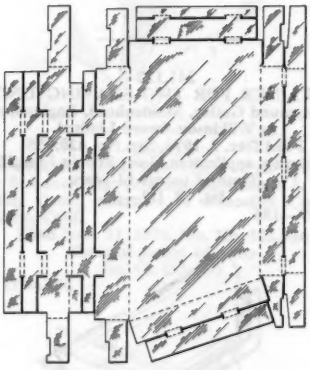


241,122
CONTAINER FOR TWO SHAVING UNITS
Derrick Raymond Gatley, Maidenhead, England, assignor to Wilkinson Sword Limited
Filed Dec. 3, 1973, Ser. No. 420,955
Claims priority, application Great Britain June 22, 1973
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—186

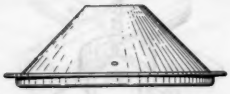
241,123
END CAP BLANK FOR A SHIPPING PACKAGE
Lewis D. Poggiali, Owosso, Mich., assignor to Olinkraft, Inc., West Monroe, La.
Filed Mar. 11, 1974, Ser. No. 449,923
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—245



241,124
END CAP BLANK FOR A SHIPPING PACKAGE
Lewis D. Poggiali, Owosso, Mich., assignor to Olinkraft, Inc., West Monroe, La.
Original application Mar. 11, 1974, Ser. No. 449,923. Divided and this application May 19, 1975, Ser. No. 578,444
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—245

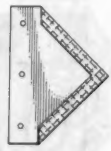


241,125
POURING ATTACHMENT FOR A CONTAINER
Richard D. Knapp, Rte. 3, Box 25–B, Evergreen, Colo. 80439
Filed May 19, 1975, Ser. No. 578,910
Term of patent 14 years
Int. Cl. D9—*07*
U.S. Cl. D9—290

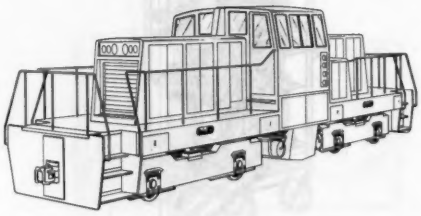


241,126
DIGITAL WATCH CASING
William James Lawrence, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.
Filed Dec. 23, 1974, Ser. No. 535,265
Term of patent 14 years
Int. Cl. D10—*02*
U.S. Cl. D10—38

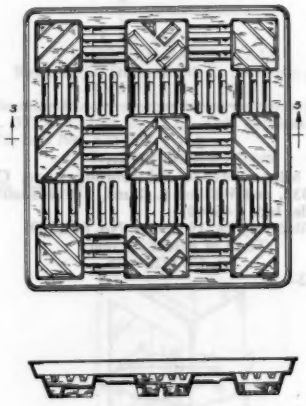
241,127
HIGHWAY SAFETY SIGN
Richard E. Diggs, 210 N. River St., Carthage, Mo. 64836
Filed Feb. 13, 1975, Ser. No. 549,504
Term of patent 14 years
Int. Cl. D10—*06*
U.S. Cl. D10—111



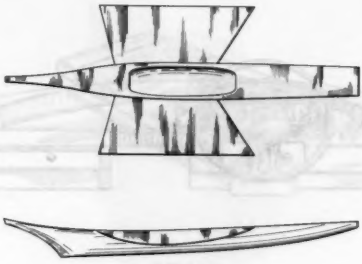
241,128
LOCOMOTIVE
James R. Chapin, Erie, Pa., assignor to General Electric Company, Erie, Pa.
Filed Dec. 20, 1974, Ser. No. 534,595
Term of patent 14 years
Int. Cl. D12—*03*
U.S. Cl. D12—38



241,129
INDUSTRIAL SHIPPING PALLET
Charles E. Griffin, Jr., High Point, N.C., assignor to Burlington Industries, Inc., Greensboro, N.C.
Filed Oct. 18, 1974, Ser. No. 516,275
Term of patent 14 years
Int. Cl. D9—*99*
U.S. Cl. D12—53

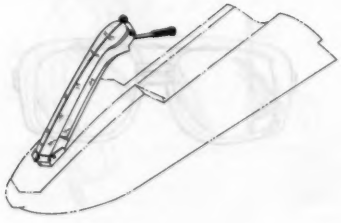


241,130
SAIL BOAT HULL
Robert W. Jackson, 5110 Baker Road, Hopkins, Minn. 55343, and Logan W. Johnson, 14091 Stonegate Lane, Minnetonka, Minn. 55343
Filed June 20, 1975, Ser. No. 588,714
Term of patent 14 years
Int. Cl. D12—*06*
U.S. Cl. D12—64

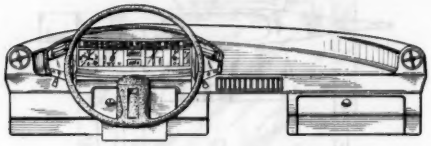


241,131
SAIL BATTEN
Roland William Sayers, 46 Harris St., Sans Souci, New South Wales 2219, Australia
Filed July 9, 1975, Ser. No. 594,233
Term of patent 14 years
Int. Cl. D12—*06*
U.S. Cl. D12—155

241,132
HANDLE COLUMN FOR A BOAT
Makoto Nakajima, Kobe-shi, and Katuichi Kato, Miki-shi, Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Kobe-shi, Hyogo-ken, Japan
Original design application Nov. 13, 1973, Ser. No. 415,346. Divided and this application Nov. 21, 1975, Ser. No. 634,184
Claims priority, application Japan May 26, 1973
Term of patent 14 years
Int. Cl. D12—*99*
U.S. Cl. D12—174



241,133
COMBINED AUTOMOBILE DASHBOARD AND STEERING WHEEL
Boris Gonzalez, Issy-les-Moulineaux, France, assignor to Societe Anonyme Automobiles Citroen, Paris, France
Filed Dec. 30, 1974, Ser. No. 537,558
Claims priority, application France July 10, 1974
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—192



241,134
SPECTACLE FRONT
Jack Bloch, Leominster, Mass., assignor to Foster Grant Co., Inc., Leominster, Mass.
Filed Dec. 13, 1974, Ser. No. 532,349
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—78

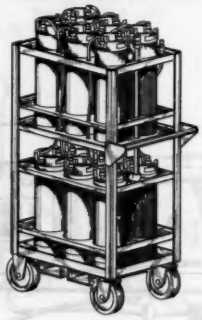
241,135
SPECTACLE FRONT
Jack Bloch, Leominster, Mass., assignor to Foster Grant Co., Inc., Leominster, Mass.
Filed Nov. 27, 1974, Ser. No. 527,932
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—78

241,136
REMINDER CARD RACK
Dale S. Ellis, De Motte, Ind. 46310, and Harriett Rex Smith, Rte. 7, Box 64, Valparaiso, Ind. 46383
Filed May 19, 1975, Ser. No. 578,491
Term of patent 14 years
Int. Cl. D6—*04;* D19—*02*
U.S. Cl. D19—90

241,137
FISHING LURE
William J. Mincer, 11924 Pebblebrook Lane, Carmel, Ind. 46032, and William L. Burtt, 11510 Trail's End, Noblesville, Ind. 46060
Filed July 28, 1975, Ser. No. 600,358
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—27

241,138
FISHING LURE
William J. Mincer, 11924 Pebblebrook Lane, Carmel, Ind. 46032, and William L. Burtt, 11510 Trail's End, Noblesville, Ind. 46060
Filed July 28, 1975, Ser. No. 600,359
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—28

241,139
PORTABLE LIQUID DISPENSING STORAGE UNIT
Manuel C. Ray, 30407 Moonmist Drive, Rancho Palos Verdes, Calif. 90274
Filed Nov. 1, 1974, Ser. No. 519,989
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—2

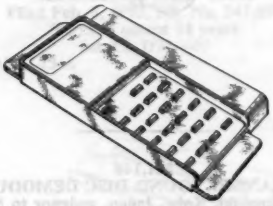


241,140
VALVE SAFETY HANDLE
Stephen Matousek and Ulrich H. Koch, Moraga, and Richard S. Di Gennaro, Berkeley, Calif., assignors to Whitey Research Tool Co., Emeryville, Calif.
Filed Apr. 29, 1975, Ser. No. 572,751
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—30

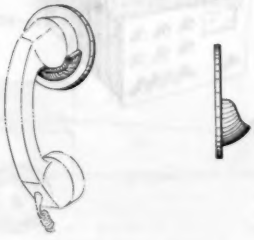
241,141
SHOWER BATH STALL
Rebecca D. Steele, 8680 E. Alameda Ave., Denver, Colo. 80231
Continuation-in-part of abandoned design application Ser. No. 375,480, July 2, 1973. This application May 19, 1975, Ser. No. 578,909
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—57

241,142
ELECTRONIC CALCULATING MACHINE
Seiichiro Nishiguchi, Osaka, Japan, assignor to Sharp Kabushiki Kaisha (Sharp Corporation), Osaka, Japan
Filed Feb. 21, 1975, Ser. No. 551,766
Claims priority, application Japan Sept. 3, 1974
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D26—5 C

241,143
PORTABLE ELECTRONIC CALCULATOR CASE
Gary E. Garnier, San Jose, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.
Filed Feb. 21, 1975, Ser. No. 551,915
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D26—5 C

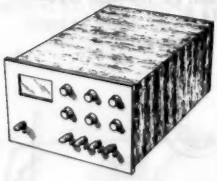


241,144
TELEPHONE HANDSET SUPPORT
William C. Davis, 12842 Brittany Woods, Santa Ana, Calif. 92405
Filed July 22, 1974, Ser. No. 490,881
Term of patent 14 years
Int. Cl. D6—*04;* D14—*03*
U.S. Cl. D26—14 A

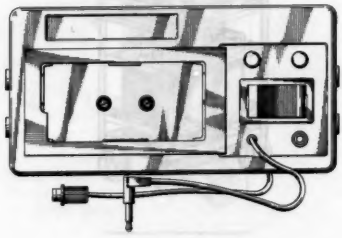


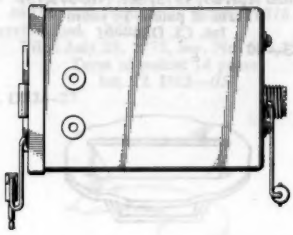
241,145
TELEPHONE
Russell F. Botelho, 166 Charles St., Cambridge, Mass. 02141
Filed Dec. 1, 1975, Ser. No. 636,670
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D26—14 A

241,146
FOUR CHANNEL SOUND DISC DEMODULATOR
Yasuhiko Funabiki, Kobe, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma, Osaka, Japan
Filed Aug. 30, 1974, Ser. No. 501,921
Claims priority, application Japan Apr. 19, 1974
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D26—14 L

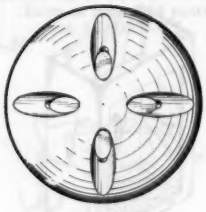


241,147
BATTERY CHARGER
John P. Daly, Maitland, William J. Donovan, Orlando, and J. Elliot MacDonald, Altamonte Springs, Fla., assignors to Scope Incorporated, Reston, Va.
Filed July 1, 1974, Ser. No. 485,013
Term of patent 14 years
Int. Cl. D13—*02*
U.S. Cl. D26—15 B

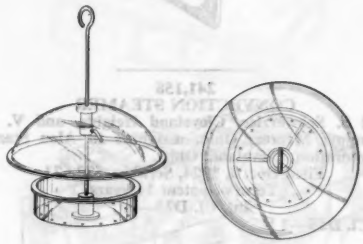




241,148
ASH TRAY
James A. McClure, 1025 Sharon Road, Santa Ana, Calif. 92706
Filed Mar. 10, 1975, Ser. No. 556,823
Term of patent 14 years
Int. Cl. D27—*03*
U.S. Cl. D27—27



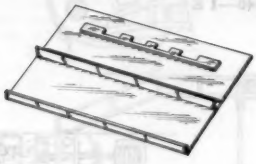
241,149
BIRD FEEDER
Isobel Miller, Greenville, N.H., and Peter Kilham, Foster, R.I., assignors to Droll Yankees, Inc.
Filed May 5, 1975, Ser. No. 574,645
Term of patent 14 years
Int. Cl. D30—*03*
U.S. Cl. D30—13



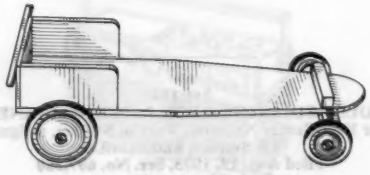
241,150
PHYSICAL EXERCISER
Arthur Hale, 22 Connaught Square, London W.2, England
Filed Feb. 12, 1975, Ser. No. 549,308
Claims priority, application Great Britain Aug. 29, 1974
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 K

241,151
FOOTBALL GOAL POST
Caesar Raymond Covino, 9 Rolling Hill Way, Clark, N.J. 07066
Filed Nov. 26, 1974, Ser. No. 527,238
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 VV

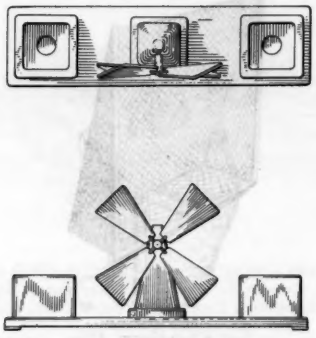
241,152
GAME BOARD HOLDER FOR PLAYING CARDS
Norma L. Tayler, 412 N. 4th St., Marshalltown, Iowa 50158
Filed Feb. 6, 1975, Ser. No. 547,691
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—13 A



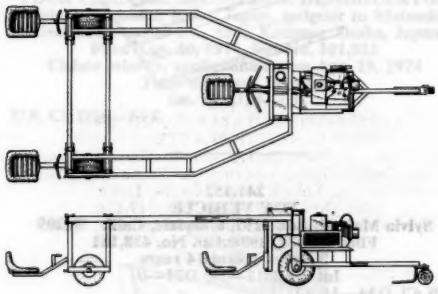
241,153
TOY VEHICLE
Sylvia Majeski, Box 1297, Glendale, Calif. 91209
Filed Jan. 31, 1974, Ser. No. 438,181
Term of patent 14 years
Int. Cl. D12—*14*; D21—*01*
U.S. Cl. D34—15 AJ



241,154
COMBINED PLANT AND CANDLE HOLDER
Le Roy J. Stangel, Box 502, Oconomowoc, Wis. 53066
Filed Dec. 10, 1975, Ser. No. 639,483
Term of patent 14 years
Int. Cl. D11—*02;* D26—*01*
U.S. Cl. D35—3 B



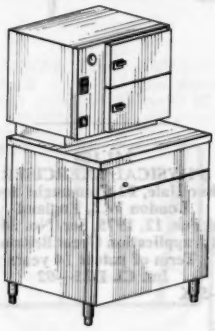
241,155
VEGETABLE HARVESTER
Derl G. Walker, R.F.D. 2, Box 479B, Mount Olive, N.C. 28365
Filed Apr. 24, 1975, Ser. No. 571,333
Term of patent 14 years
Int. Cl. D15—*03*
U.S. Cl. D40—1 E



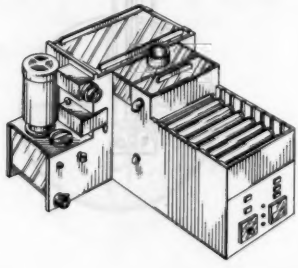
241,156
DUST COLLECTOR FOR PAPER MACHINES
Bror Karl Gustav Nystrom, Vaxajo, Sweden, assignor to AB Svenska Flaktfabriken
Filed Aug. 19, 1975, Ser. No. 607,380
Term of patent 14 years
Int. Cl. D15—*05*
U.S. Cl. D49—11

241,157
PENDANT
Eugene A. Poulin, 85 Royal Oak Road, New Britain, Conn. 06053
Filed Feb. 7, 1975, Ser. No. 547,996
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D45—17

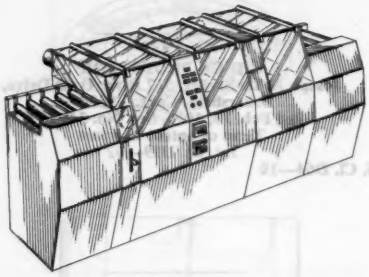
241,158
CONVECTION STEAMER
David S. Schwerzler, Cleveland Heights, and V. Paul Lovejoy, Mentor, Ohio, assignors to Alco Standard Corporation, Cleveland, Ohio
Filed Dec. 2, 1974, Ser. No. 528,673
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D55—1 E



241,159
SPRAY ETCHER FOR WORK PIECES IN WHICH THE WORK PIECES FIRST MOVE INTO THE ETCHER IN ONE DIRECTION AND THEN LEAVE THE ETCHER IN A REVERSE DIRECTION
Marshall I. Gurian and Gary D. Rolih, Tempe, Ariz., assignors to Philip A. Hunt Chemical Corp., Palisades Park, N.J.
Filed June 6, 1975, Ser. No. 584,261
Term of patent 14 years
Int. Cl. D15—*09*
U.S. Cl. D55—1 R



241,160
SPRAY ETCHER FOR WORK PIECES IN WHICH THE WORK PIECES PROGRESS IN A SINGLE DIRECTION FROM AN INPUT END TO AN OUTPUT END
Marshall I. Gurian, Tempe, and Peter F. J. Rose, Phoenix, Ariz., assignors to Philip A. Hunt Chemical Corp., Palisades Park, N.J.
Filed June 9, 1975, Ser. No. 584,811
Term of patent 14 years
Int. Cl. D15—*09*
U.S. Cl. D55—1 R

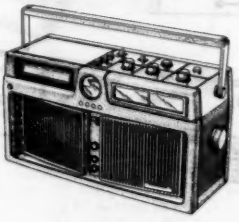


241,161
RECORD PLAYER
Shigenori Tomioka, Tokyo, Japan, assignor to Japan Metals & Chemicals Co., Ltd., Tokyo, Japan
Filed July 29, 1974, Ser. No. 492,547
Term of patent 3½ years
Int. Cl. D14—*01*
U.S. Cl. D56—4 R

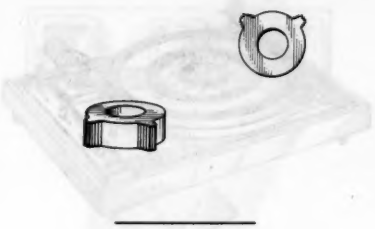
241,162
RECORD PLAYER
Irwin J. Lubalin, Rockville Centre, N.Y., assignor to Avnet, Inc., New York, N.Y.
Filed Dec. 23, 1974, Ser. No. 535,426
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D56—4 R

241,163
RADIO CABINET
Robert F. Zivica, St. Clair Shores, Mich., assignor to Pro Sports Marketing, Inc., Concord, Calif.
Filed May 21, 1973, Ser. No. 362,404
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D56—4 B

241,164
COMBINED PORTABLE RADIO AND CASSETTE PLAYER
Kikuo Ohta, Katano, Osaka, and Toshimasa Akazawa, Yao, Osaka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Osaka, Japan
Filed Oct. 30, 1974, Ser. No. 519,176
Claims priority, application Japan June 25, 1974
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D56—4 B

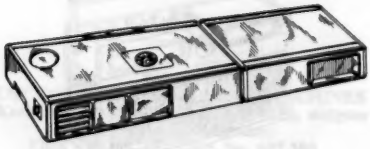


241,165
BINOCULAR ADJUSTMENT KNOB
Claus O. Huckenbeck, Sherman Oaks, Calif., assignor to Bausch & Lomb Incorporated, Rochester, N.Y.
Filed Apr. 30, 1975, Ser. No. 573,580
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—59

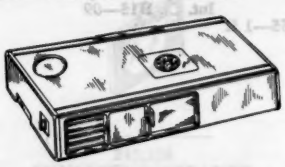


241,166
BINOCULAR ADJUSTMENT KNOB
Claus O. Huckenbeck, 15474 Dickens St., Sherman Oaks, Calif. 91403
Filed Apr. 30, 1975, Ser. No. 573,581
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—59

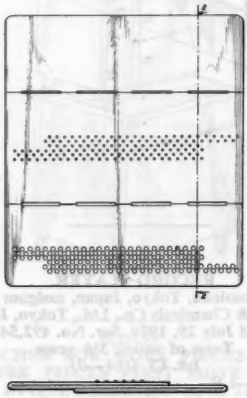
241,167
COMBINED PHOTOGRAPHIC CAMERA AND STROBE
Cooper C. Woodring, Plandome, and Ronald Emmerling, New City, N.Y., and Michael Boehm, Green Farms, Conn., assignors to J. C. Penney Co., Inc., New York, N.Y.
Filed June 26, 1974, Ser. No. 483,395
Term of patent 14 years
Int. Cl. D16—*01*
U.S. Cl. D16—6



241,168
PHOTOGRAPHIC CAMERA WITH PROVISION FOR SIDE MOUNTED STROBE
Cooper C. Woodring, Plandome, and Ronald Emmerling, New City, N.Y., assignors to J. C. Penney Co., Inc., New York, N.Y.
Filed June 26, 1974, Ser. No. 483,393
Term of patent 14 years
Int. Cl. D16—*01*
U.S. Cl. D16—6

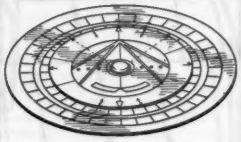


241,169
CHECK PROTECTOR
Joseph A. La Barber, 317 River Oaks Drive, Bakersfield, Calif. 93309
Filed Feb. 13, 1975, Ser. No. 549,573
Term of patent 14 years
Int. Cl. D19—*02*
U.S. Cl. D64—10

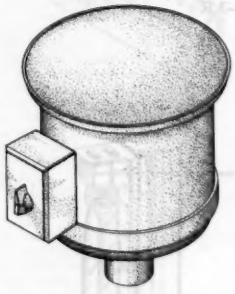


241,170
TYPEWRITER
Robert S. Metzner, Syracuse, N.Y., assignor to SCM Corporation, New York, N.Y.
Filed Jan. 6, 1975, Ser. No. 538,635
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D64—11 A

241,171
ROTARY SLIDE RULE
Arthur Liley, 766 Merriman Road, Akron, Ohio 44303
Continuation-in-part of abandoned design application Ser. No. 379,503, July 16, 1973. This application Sept. 16, 1975, Ser. No. 614,056
Term of patent 14 years
Int. Cl. D19—*99*
U.S. Cl. D64—11 B

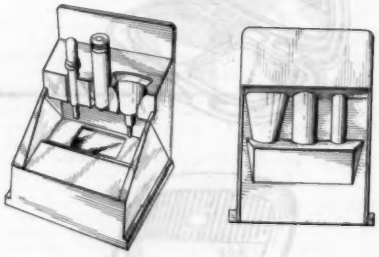


241,172
AERATOR PUMP FOR A SWIMMING POOL SPA
Lawrence E. Johnson, 25161 Via Elevado, Dana Point, Calif. 92629
Filed May 12, 1975, Ser. No. 576,259
Term of patent 14 years
Int. Cl. D15—*02*
U.S. Cl. D65—1 R

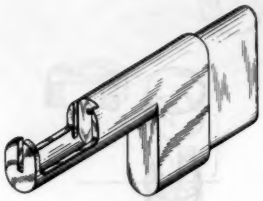


241,173
PREGNANCY DIAGNOSTIC APPARATUS
Gilbert Roger Corneille, Paris, France, assignor to Laboratoire Theranol, Paris, France
Continuation-in-part of abandoned design application Ser. No. 477,344, June 7, 1974. This application Oct. 1, 1975, Ser. No. 618,418
Term of patent 14 years
Int. Cl. D9—*03;* D24—*02*
U.S. Cl. D83—1 U

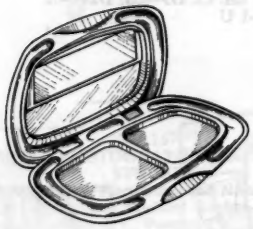
241,174
PREGNANCY DIAGNOSTIC APPARATUS
Gilbert Roger Corneille, Paris, France, assignor to Laboratoire Theranol, Paris, France
Continuation-in-part of abandoned design application Ser. No. 477,344, June 7, 1974. This application Oct. 1, 1975, Ser. No. 618,417
Term of patent 14 years
Int. Cl. D9—*03;* D24—*02*
U.S. Cl. D83—1 U

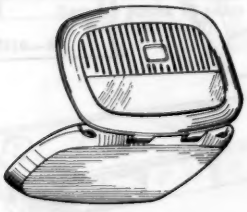


241,175
EAR-PIERCING DEVICE
Samuel Mann, Englewood, N.J., assignor to Inverness Corporation
Filed Sept. 23, 1975, Ser. No. 615,863
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D83—12 A



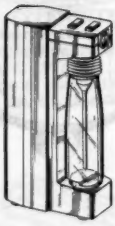
241,176
COMBINED COMPACT AND MAKEUP MIRROR
Ted I. Kingsford, Memphis, Tenn., assignor to Plough, Inc., Memphis, Tenn.
Original design application Jan. 14, 1974, Ser. No. 433,434, now Patent No. 238,310. Divided and this application Sept. 22, 1975, Ser. No. 615,327
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D86—10 N



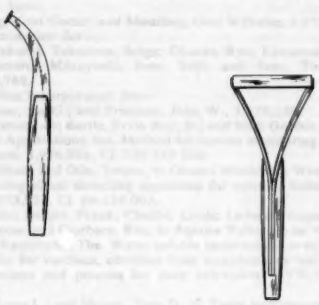


241,177
DISK STORAGE UNIT OR SIMILAR ARTICLE
Bernard T. Cournoyer, Holden, and David M. Wright and Jerome M. O'Toole, Shrewsbury, Mass., assignors to Barry Wright Corporation, Watertown, Mass.
Filed Mar. 7, 1975, Ser. No. 556,199
Term of patent 14 years
Int. Cl. D3—*99*; D9—*99*; D14—*99*
U.S. Cl. D87—1 D

241,178
CARBONATING MACHINE
Peter Frank Haythornthwaite, 3A Dallinghoe Crescent, Milford, Auckland, New Zealand
Filed June 27, 1974, Ser. No. 483,779
Term of patent 14 years
Int. Cl. D15—*08*
U.S. Cl. D94—3 R

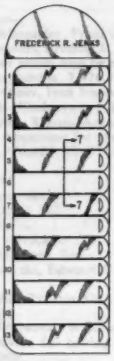


241,179
RAZOR HANDLE
Martin Glaberson, Stratford, Conn., assignor to Warner-Lambert Company
Filed Apr. 18, 1975, Ser. No. 569,252
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D95—3 A



241,180
ELECTRIC RAZOR
Klaus Limberg, Solingen, Germany, assignor to Robert Krups, Solingen, Germany
Filed Mar. 14, 1974, Ser. No. 451,372
Claims priority, application Germany Sept. 27, 1973
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D95—3 A

241,181
MAGNETIC VARIABLE FORMAT APPOINTMENT BOARD OR THE LIKE
Frederick R. Jenks, P.O. Box 9235, Sacramento, Calif. 95816
Filed Mar. 12, 1975, Ser. No. 557,631
Term of patent 14 years
Int. Cl. D20—*03*
U.S. Cl. D96—12 E



241,182
PATIENT STATUS INDICATOR
Mildred Jaynes, Amherst Junction, Wis. 54407
Filed Dec. 12, 1975, Ser. No. 640,202
Term of patent 14 years
Int. Cl. D20—*03*
U.S. Cl. D96—12 R

LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 24TH DAY OF AUGUST, 1976

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A.O. Smith Corporation: *See—*
Vanjani, Chandu R., 3,976,924.
A/S Kongsberg Vapenfabrik: *See—*
Westby, Ola, 3,976,382.
Aaron, James Calvin. Worm holder. 3,975,853, Cl. 43-4.000.
AB ID-Kort: *See—*
Hogberg, Knut Goran; and Meurling, Olof Wilhelm, 3,976,857.
Abbott Laboratories: *See—*
Nara, Takashi; Takasawa, Seigo; Okachi, Ryo; Kawamoto, Isao; Yamamoto, Mitsuyoshi; Sato, Seiji; and Sato, Tomoyasu, 3,976,768.
ACF Industries, Incorporated: *See—*
Chambless, Joe G.; and Freeman, John W., 3,976,130.
Acton, Lawrence Lee; Bartle, Ervin Roy, Jr.; and Hall, Gordon Dennis, to Science Applications, Inc. Method for remote monitoring of gaseous products. 3,976,884, Cl. 250-343.000.
Adachi, Nokihisa; and Oda, Tetuzo, to Okuma Machinery Works, Ltd. Synchronizing signal detecting apparatus for circular knitting machines. 3,975,928, Cl. 66-154.00A.
Adam, Arlette; Berger, Frank; Chedid, Louis; Lederer, Edgar; Petit, Jean-Francois; and Ciorbaru, Rita, to Agence Nationale de Valorisation de le Recherche, The. Water-soluble immunological adjuvants, in particular for vaccines, obtained from mycobacteria and related microorganisms and process for their extraction. 3,976,544, Cl. 195-2.000.
Adams, Anthony L.; and Moore, Troy D., to Texas Instruments Incorporated. Vacuum braking system for semiconductor wafers. 3,976,329, Cl. 302-2.00R.
Adams, Frederick John, to Cam Gears Limited. Constant speed drive. 3,975,964, Cl. 74-230.17A.
Adams, Phillip: *See—*
Merianos, John J.; and Adams, Phillip, 3,976,587.
Adamson, James R., Jr., to United States of America, Army. Variable height work surface. 3,976,281, Cl. 254-126.000.
Aebi, Otto, to Hermes Precisa International S.A. Typewriter ribbon conveying mechanism. 3,976,185, Cl. 197-162.000.
AEG Elotherm G.m.b.H.: *See—*
Reinke, Friedhelm; Voss, Hermann; and Geisel, Herbert, 3,976,520.
Aeronca, Inc.: *See—*
Logsdon, Hillard Glenn, 3,976,244.
Aeronutronic Ford Corporation: *See—*
Garrigus, Walter E.; and Glick, Murry I., 3,976,953.
Agence Nationale de Valorisation de la Recherche (ANVAR): *See—*
Le Floch, Albert; and Stephan, Guy, 3,976,957.
Agence Nationale de Valorisation de le Recherche, The: *See—*
Adam, Arlette; Berger, Frank; Chedid, Louis; Lederer, Edgar; Petit, Jean-Francois; and Ciorbaru, Rita, 3,976,544.
Ager, Patrick William: *See—*
Boggs, Beryl Aaron; Balint, Laszlo Joseph; Ager, Patrick William; and Buyalos, Edward Jerome, 3,976,431.
AGFA-Gevaert, A.G.: *See—*
Hujer, Friedrich, 3,976,376.
Aggus, John R.; Giordano, Salvatore T.; and Halama, Henry J., to United States of America, Energy Research and Development Administration. Eccentric superconducting RF cavity separator structure. 3,976,950, Cl. 328-229.000.
Airco, Inc.: *See—*
Wallouch, Rudolph W., 3,976,496.
Airwick Industries, Inc.: *See—*
Hennart, Claude, 3,976,769.
Aizawa, Tatsuo: *See—*
Nihyakumen, Kouzi; Yokoyama, Taizo; Ueda, Yasuo; Kamezawa, Yasutoki; and Aizawa, Tatsuo, 3,976,488.
Akamatu, Yoshimi: *See—*
Takida, Hiroshi; and Akamatu, Yoshimi, 3,976,618.
Akebono Brake Industry Co., Ltd.: *See—*
Ogawa, Yutaka, 3,976,169.
Akerman, Sven Bengt Arvid: *See—*
Lindberg, Ulf Hendrik Anders; and Akerman, Sven Bengt Arvid, 3,976,771.
Akiyama, Shinichi; and Yamamoto, Haruhisa, to Nippon Zeon Co., Ltd. Process for preparing unsaturated carboxylic acids. 3,976,688, Cl. 260-530.00N.
Akiyama, Tsuneharu: *See—*
Inouye, Sakae; Kurahashi, Suminobu; Wada, Norio; Kikuchi, Motokazu; Masuda, Kinji; Akiyama, Tsuneharu; and Osaki, Toshiyuki, 3,976,624.
Alba-Waldensian, Incorporated: *See—*
Fregeolle, Oscar, 3,975,929.
Albertson, Noel F.; and Michne, William F., to Sterling Drug Inc. 3-Piperidine-methanols. 3,976,653, Cl. 260-293.830.
Alburn, Harvey E.; and Grant, Norman H., to American Home Products Corporation. Amides of 1-aminocyclo-pentanecarboxylic acid. 3,976,692, Cl. 260-557.00R.
Alcock, Keith, to Dresser Industries, Inc. Gas scrubber. 3,976,456, Cl. 55-238.000.
Alexander, Carl J.; and Boudeman, Robert J., to Wells Manufacturing Corporation. Animal-actuated watering valve. 3,976,280, Cl. 251-339.000.
Alexander, Franklin L.: *See—*
Bolton, Jack C.; and Alexander, Franklin L., 3,976,087.
Alfenaar, Marinus; and Cremers, Freddie J., to Stamicarbon B.V. Process of reducing nitrate or nitrile ions by means of liquid amalgams, with formation of hydroxylamine. 3,976,755, Cl. 423-387.000.
Alien, Imant Karlovich; Avdeev, Ivan Ivanovich; Gelfandbein, Yakov Aronovich; Ershov, Boris Nikolaevich; Nikonenko, Anatoly Vasilievich; Popov, Jury Olegovich; Khesin, Arkady Yakovlevich; and Yanson, Boris Albertovich. Apparatus for evaluating characteristics of the images of objects. 3,976,827, Cl. 178-6.000.
ALKEM GmbH: *See—*
Lins, Werner, 3,976,748.
All American Industries, Inc.: *See—*
Doolittle, Donald B., 3,976,265.
All-State Industries, Inc.: *See—*
Fischer, Harry F., Jr., 3,975,880.
Allegheny Ludlum Industries, Inc.: *See—*
Blank, Denis A.; Falkowski, Edward C.; and Pitler, Richard K., 3,976,517.
Allen, Jan K., to Caterpillar Tractor Co. Anti-tipping log skidder. 3,976,210, Cl. 214-85.500.
Allen, John Wesley; and Waiwood, William P., to Singer Company, The. Position sensing device for sewing instrumentality actuator. 3,976,019, Cl. 112-158.00E.
Allen, Richard Glenn, to Brown Oil Tools, Inc. Retrievable well packer. 3,976,133, Cl. 166-120.000.
Allied Automotive, Inc.: *See—*
Aprill, Theophil, Jr., 3,975,944.
Allied Chemical Corporation: *See—*
Boggs, Beryl Aaron; Balint, Laszlo Joseph; Ager, Patrick William; and Buyalos, Edward Jerome, 3,976,431.
Wilkalis, John E.; Barbaz, Charles G.; and Trout, Horace Q., 3,976,757.
Yodis, Anthony W.; Kremers, Frank J.; and Lintern, Karol K., 3,976,751.
Allmanna Svenska Elektriska Aktiebolaget: *See—*
Eriksson, Leif; and Thornell, Lennart, 3,976,920.
Rehnman, Kjell, 3,976,930.
Aloia, Romeo Raymond, to American Cyanamid Company. Free-flowing beads of particles of an acrylate elastomer. 3,976,611, Cl. 260-23.0AR.
Alsop, Reese Fell. Examining glove. 3,975,775, Cl. 2-163.000.
Altex Scientific, Inc.: *See—*
Major, Emery, 3,976,400.
Altmann, Horst Dieter; and Haupt, Eberhard, to Wilhelm Haupt, Firma. Electrical heating mat. 3,976,855, Cl. 219-532.000.
Altschuler, Samuel; Traylor, Frank T.; Ziemer, Richard W.; and Knight, Charles A., to United States of America, Army. Pyrotechnic seeding pellet. 3,976,008, Cl. 102-31.000.
Amada, Kozo: *See—*
Kamimura, Haruo; Yamashita, Yukio; Nakai, Toshitugu; Wadano, Katsumi; Amada, Kozo; and Matsuda, Yoshitane, 3,975,937.
Aman, Kurt Arvid, to Telefonaktiebolaget L M Ericsson. Prevention of non-allowed character combinations. 3,976,972, Cl. 340-146.1AB.
Amend, Alfred: *See—*
Chinai, Kays; and Amend, Alfred, 3,976,075.
Amerace Corporation: *See—*
Newnom, Richard S., 3,975,787.
American Air Filter Company, Inc.: *See—*
Dahlem, Francis E., 3,976,455.
Shuler, Bernard R., 3,975,995.
American Cyanamid Company: *See—*
Aloia, Romeo Raymond, 3,976,611.
Corver, Hans A.; and Robertson, Allan J., 3,976,752.
Diehl, Robert Eugene; Schrider, Michael Stanley; and Kantor, Sidney, 3,976,785.
Hoffman, Joseph Adrian, 3,976,685.
Tanahashi, Kunio; and Narisi, Yukitoshi, 3,976,738.
Ueno, Eichiro; Kawasaki, Hideo; and Shigita, Syozo, 3,976,425.
American Home Products Corporation: *See—*
Alburn, Harvey E.; and Grant, Norman H., 3,976,692.
Freed, Meier E.; and Potoski, John R., 3,976,693.
Freed, Meier E.; and Potoski, John R., 3,976,696.
American Magnetics Corporation: *See—*
Haun, Marion W., 3,976,858.
American Optical Corporation: *See—*
Richards, William; and Grolman, Bernard, 3,975,779.
American Shower Door Co., Inc.: *See—*
Laby, Jordan M., 3,976,316.
American Stovalator Corporation: *See—*
Breen, Max; and Kardas, James R., 3,976,047.

American Velodur Metal, Inc.: *See—*
Schinabeck, Rainer, 3,976,613.
Ames, Willard H. Chill cooler. 3,976,459, Cl. 62-266.000.
Amlong, William R., to Safety Laboratories, Inc. Gas dispensing assembly. 3,976,067, Cl. 128-203.000.
Amoco Production Company: *See—*
Carman, Wilson H., Jr., 3,976,161.
AMP Incorporated: *See—*
Fleischhacker, James Earl; Nicholas, Vincent; and Wasserlein, Henry George, Jr., 3,975,812.
Simmons, Reginald John, 3,976,348.
Amphora Enterprises Inc.: *See—*
Moudry, George M.; Moudry, Nancy Lee; Casiello, Nicholas F.; and Marino, Anthony V., 3,976,234.
Anaconda Company, The: *See—*
Partin, Clyde, 3,976,086.
Anderberg, Hans Erik. Lead-through for electric cables and the like. 3,976,825, Cl. 174-151.000.
Anderson Brass Company: *See—*
Kass, Gerald H., deceased; and Knauer, Frederick O., administrator, 3,976,096.
Anderson, Buddy W., to Halliburton Company. Method of forming a highly permeable solid mass in a subterranean formation. 3,976,135, Cl. 166-276.000.
Anderson, Charles F.: *See—*
Dougherty, Nathan S., Jr.; and Anderson, Charles F., 3,975,955.
Anderson, Howard R.: *See—*
Clark, Ralph B.; and Anderson, Howard R., 3,976,154.
Ando, Masao, to Chisso Corporation. Method for passing an insulated wire through the inside of ferromagnetic pipe for a heat-generating pipe utilizing skin effect current. 3,975,819, Cl. 29-611.000.
Ando, Momofuku, to Nissin Shokuhin Kaisha, Ltd. Food self-contained in a cooking container and process for making the same. 3,976,795, Cl. 426-115.000.
Ando, Yujiro; Ohara, Katsunobu; and Tanaka, Keiji, to Canon Kabushiki Kaisha. Screen electrophotographic process. 3,976,484, Cl. 96-1.00R.
Andou, Takao: *See—*
Hyakutake, Yasuhiko; and Andou, Takao, 3,976,398.
Andreae, Johannes Franciscus Reinardus, to Bos Kalis Westminster Group N.V. Method and apparatus for dredging employing a transport fluid flowing in substantially closed recirculating course. 3,975,842, Cl. 37-58.000.
Andreeva, Viktoria Ivanovna; Popova, Alexandra Ljudovikovna; and Lapatukhin, Veniamin Semenovich. Method of manufacturing high-frequency raster with irregular structure of raster elements. 3,976,523, Cl. 156-6.000.
Anger, Ernest G., to Square D Company. Dual channel dynamic line isolation monitor. 3,976,987, Cl. 340-255.000.
Antogini, Enrico. Device for converting fluid flow into kinetic energy. 3,976,396, Cl. 416-119.000.
Aprill, Theophil, Jr., to Allied Automotive, Inc. Hydrostatic testing and recording apparatus. 3,975,944, Cl. 73-40.50R.
Arakawa Rinsan Kagaku Kogyo Kabushiki Kaisha: *See—*
Ariyoshi, Junji; Ohnishi, Akira; Toda, Hiromi; Kunimori, Kametaro; and Nakao, Mitsuyoshi, 3,976,824.
Ariyoshi, Junji; Ohnishi, Akira; Toda, Hiromi; Kunimori, Kametaro; and Nakao, Mitsuyoshi, to Arakawa Rinsan Kagaku Kogyo Kabushiki Kaisha. Treating agent useful for fibrous materials and preparation thereof. 3,976,824, Cl. 526-23.000.
Armour Pharmaceutical Company: *See—*
Hughes, John Lawrence; Liu, Robert Chung-Huan; Enkoji, Takashi; and Bastian, James Winslow, 3,976,787.
Arneklev, Duane R.; Pallos, Ferenc M.; and Gaughan, Edmund, to Stauffer Chemical Company. Halogenated ketones as herbicide antidotes. 3,976,469, Cl. 71-100.000.
Aroca, Consuelo Belda, legal heir: *See—*
Pinero, Emilio Perez, deceased, 3,975,872.
Arya, Vishwa Prakash: *See—*
Nagarajan, Kuppuswamy; Arya, Vishwa Prakash; and George, Thomas, 3,976,778.
Asahi Kasei Kogyo Kabushiki Kaisha: *See—*
Satake, Kunio; Yamada, Tsuyoshi; Sakamoto, Kuniaki; Hayakawa, Kiyoshi; and Fukawa, Isaburo, 3,976,721.
Yamashita, Iwao; and Shimizu, Miyuki, 3,976,049.
Asahi Kogaku Kogyo Kabushiki Kaisha: *See—*
Takahashi, Yasuo; and Okudaira, Sadao, 3,976,367.
Asayama, Kingo. Flanged foundation pile group and method of constructing a foundation by means of the same. 3,975,917, Cl. 61-53.000.
Ashley, Albert H., to GTE Sylvania Incorporated. Switching network having improved turn-on capability. 3,976,845, Cl. 179-18.0GF.
Ashman, Robert G., Jr. Fireplace structure. 3,976,048, Cl. 126-143.000.
Astra Lakemedel Aktiebolag: *See—*
Lindberg, Ulf Hendrik Anders; and Akerman, Sven Bengt Arvid, 3,976,771.
Atago, Takeshi: *See—*
Shimo, Shoji; and Atago, Takeshi, 3,975,905.
Atherton, Ira W. Handbag with means for illuminating the interior thereof. 3,976,871, Cl. 240-6.45P.
Athey, John E., to McNeil Corporation. Tire curing press center mechanism. 3,976,409, Cl. 425-48.000.
Atlantic Richfield Company: *See—*
Erickson, Henry, deceased; and Erickson, Doris, executor, 3,976,560.
Hearn, Daniel P., 3,976,937.
Lampadarios, George V., 3,976,433.
Atomenergikommissionen: *See—*
Markland, Svend Aage, 3,976,475.
Attwood, Brian William; and Hicklin, Denis Raymond, to Karl Kroyer St. Anne's Limited. Apparatus for making fibrous sheet material. 3,976,412, Cl. 425-81.000.
Aulich, Gunter; Schultz, Dieter; and Rosel, Wilhelm, to VEB Nahmaschinenwerk Wittenberge. Sewing machine and ironing device. 3,976,020, Cl. 112-217.000.
Austin, Joseph M.: *See—*
Parkinson, Kelvin L.; and Austin, Joseph M., 3,976,979.
Austral-Erwin Engineering Co.: *See—*
Erwin, Ransome W., 3,976,537.
Auto Research Corporation: *See—*
Smith, Carl H., 3,976,989.
Automatik Apparate-Maschinenbau Hans Hench GmbH: *See—*
Hench, Hans, Sr.; Hunke, Friedrich; and Wolber, Claus, 3,976,254.
Autotrol Corporation: *See—*
Torpey, Wilbur N., 3,976,568.
Avar, Lajos; Hofer, Kurt; and Preiswerk, Martin, to Sandoz Ltd. Pyrazole derivatives. 3,976,658, Cl. 260-310.00R.
Avdeev, Ivan Ivanovich: *See—*
Alien, Imant Karlovich; Avdeev, Ivan Ivanovich; Gelfandbein, Yakov Aronovich; Ershov, Boris Nikolaevich; Nikonenko, Anatoly Vasilievich; Popov, Jury Olegovich; Khesin, Arkady Yakovlevich; and Yanson, Boris Albertovich, 3,976,827.
Avon Products, Inc.: *See—*
Paris, Wayne H.; Wolfe, Ronald C.; Fay, Terrence P.; and Lindquist, Robert D., 3,976,736.
Avrahami, Zohar: *See—*
Seidman, Ady; Avrahami, Zohar; Sheinfux, Benjamin; and Grinberg, Jan, 3,976,905.
Ayres, Weldon R., to Sherwood Medical Industries Inc. Method for making elastic gloves. 3,975,776, Cl. 2-168.000.
B. F. Goodrich Company, The: *See—*
Lopacki, Edwin Francis, 3,975,830.
Morris, Roger E.; and Tucker, Harold, 3,976,610.
Morris, Roger E., 3,976,627.
Starmer, Philip H., 3,976,625.
B/J Manufacturing Co., Inc.: *See—*
Neier, Benjamin R., 3,976,186.
Baars, Dieter. Wall-mounted notice board. 3,975,837, Cl. 35-63.000.
Babai, David; and Shabtai, Joseph. Key-operated door locking device. 3,975,934, Cl. 70-120.000.
Babcock-Hitachi K.K.: *See—*
Nakajima, Fumito; Tekeuchi, Masato; Matsuda, Shimpei; Uno, Shigeo; Mori, Toshikatsu; Watanabe, Yoshihisa; and Imanari, Makoto, 3,976,745.
Babinski, John Paul; Bertelsen, Bruce Irving; Raacke, Karl Heinz; Sirgo, Valdeko Harry; and Townsend, Clarence Jay, to International Business Machines Corporation. Transport system for semiconductor wafer multiprocessing station system. 3,976,330, Cl. 302-2.00R.
Babjak, Juraj: *See—*
Blanco, Jose A.; Wortman, Gregory G.; Babjak, Juraj; and Itzkovitch, Irwin J., 3,976,742.
Bacchin, Paolo: *See—*
Palladino, Nicola; Mazzei, Marcello; Bacchin, Paolo; and Marconi, Walter, 3,976,621.
Baghuis, Ludovicus Hendrikus, to IVA Gebr. Ten Vaarwerk B.V. Assembly tables. 3,976,289, Cl. 269-56.000.
Baguelin, Yves, to Societe Anonyme de Vehicules Industriels et d'Equipements Mecaniques SAVIEM. Multicylinder internal combustion engine of the Diesel type. 3,976,042, Cl. 123-139.0AR.
Bailey, Escar L.: *See—*
Hunter, Joe S.; Bailey, Escar L.; and Little, Little J., 3,975,961.
Bailey, James B., to Quaker State Oil Refining Corporation. Dispersing method and apparatus for metering the dispersing of dry particulate material into a liquid. 3,976,109, Cl. 141-9.000.
Bakelite Xylonite Limited: *See—*
Jack, James; and Gray, Derek Cory, 3,976,410.
Baker, Charles T.: *See—*
Catagnus, Philip C.; and Baker, Charles T., 3,977,018.
Baker, Don R., to Stauffer Chemical Company. Diphenyl ether amides. 3,976,470, Cl. 71-100.000.
Baker, Donald C.: *See—*
Maurer, Herman J.; and Baker, Donald C., 3,976,156.
Baker, Lester H. Plant root extraction tool. 3,976,282, Cl. 254-132.000.
Baker Perkins Holdings Limited: *See—*
Edwards, Albert, 3,976,255.
Bako, Lazlo, to Presto Lock Company, Division of Walter Kidde & Company, Inc. Latching device. 3,975,933, Cl. 70-70.000.
Baldwin, Frederick M.; and Noesen, Stanley J., to General Electric Company. Forming apparatus. 3,975,936, Cl. 72-38.000.
Baldyga, Joseph W.; and Cairns, Thomas M., to Diamond Die & Mold Co. Stop feed mechanism. 3,976,235, Cl. 226-11.000.
Balint, Laszlo Joseph: *See—*
Boggs, Beryl Aaron; Balint, Laszlo Joseph; Ager, Patrick William; and Buyalos, Edward Jerome, 3,976,431.
Ball, Dean M.; Camp, Ronnie W.; Hendrix, Warren P.; and Orr, Clyde, Jr., to Micromeritics Instrument Corporation. Liquid chromatography sample measuring and introducing apparatus. 3,975,946, Cl. 73-61.10C.
Ball, Warren. Boat loader. 3,976,213, Cl. 214-450.000.

Balluff, Robert N., to Tenneco Inc. Catalytic converter for exhaust gases. 3,975,826, Cl. 29-157.00R.

Bally Manufacturing Corporation: *See—*
Nicolaus, Frank G., 3,975,963.

Balogh, John, Jr.: *See—*
Carnes, W. Robert, Jr.; Selnick, Lester L.; and Balogh, John, Jr., 3,976,198.

Bandamatic System Services Kabushiki Kaisha: *See—*
Nakane, Jun, 3,975,994.

Banfi, Antonio, to Societa Italiana Elettronica S.p.A. Circuit for testing a logic delay timer. 3,976,893, Cl. 307-208.000.

Banfi, Antonio, to Societa Italiana Elettronica S.p.A. Method and circuit for in-service testing of an electro-magnetically actuated component. 3,976,933, Cl. 324-28.00R.

Barbaz, Charles G.: *See—*
Wilkalis, John E.; Barbaz, Charles G.; and Trout, Horace Q., 3,976,757.

Barclay, Doltie W., to Bates, Clarence F.; Heron, William D.; Bates, Gerald E.; and Mason, Irving, part interest to each. Joint flexing apparatus. 3,976,057, Cl. 128-25.00R.

Barcza, Sandor, to Sandoz, Inc. 1-Succinoyl-2,4-disubstituted-4b,5,6,7,8,8a,9,10-octahydro-9-oxo-phenanthrenes and compositions and methods for treating lipodemia. 3,976,684, Cl. 260-514.500.

Barefoot, Carlton K., to Tred-X Corporation. Tread applying machine. 3,976,532, Cl. 156-405.000.

Bargigia, Gianangelo: *See—*
Caporiccio, Gerardo; and Bargigia, Gianangelo, 3,976,603.

Barnes, William P., Jr.; and Wirtenson, G. Richard, to Itek Corporation. Radiation damage resistant mirror. 3,976,890, Cl. 250-510.000.

Barnett, Charles B.: *See—*
Ekama, Peter J.; Hansen, Kenneth R.; and Barnett, Charles B., 3,976,264.

Barnich, Richard G., to Process Computer Systems, Inc. Method and apparatus for evaluating torquing operations. 3,975,954, Cl. 73-139.000.

Barnish, Ian T.: *See—*
Cox, David A.; Barnish, Ian T.; and Evans, Anthony G., 3,976,783.

Barns, Robert Leroy, to Bell Telephone Laboratories, Incorporated. Screening seeds for quartz growth. 3,976,535, Cl. 156-601.000.

Baron, George B.; and Padrutt, Paul W., to Marion Power Shovel Company, Inc. Motion limit system for power shovels. 3,976,211, Cl. 214-138.00R.

Barosko, John M.: *See—*
Barth, Benedict G.; Willette, Earl G.; and Barosko, John M., 3,975,986.

Barth, Benedict G.; Willette, Earl G.; and Barosko, John M., to Tenneco Inc. Weep hole for hydraulic jack. 3,975,986, Cl. 91-402.000.

Bartle, Ervin Roy, Jr.: *See—*
Acton, Lawrence Lee; Bartle, Ervin Roy, Jr.; and Hall, Gordon Dennis, 3,976,884.

Bartley, Erle E.: *See—*
Salvesen, Robert H.; Malloy, Paul L.; Bartley, Erle E.; and Meyer, RoNel M., 3,976,766.

Barton, Charles Emory: *See—*
Maus, Leo Donald; and Barton, Charles Emory, 3,976,148.

Barton, Paul, to International Standard Electric Corporation. Tracking filter for frequency measurement in a Doppler type navigation guidance system or the like. 3,977,002, Cl. 343-106.00D.

Bartsch, Wolfgang: *See—*
Leinert, Herbert; Popelak, Alfred; Stach, Kurt; Bartsch, Wolfgang; and Dietmann, Karl, 3,976,779.

Basel, Donald R.; and Kawolics, Raymond P., to Tomlinson Industries, Inc. Pinch tube valve. 3,976,277, Cl. 251-7.000.

BASF Aktiengesellschaft: *See—*
Fabian, Wolfgang; and Schrempp, Klaus, 3,976,649.
Fischer, Adolf, 3,976,468.

Bassett, Ronald M. Automatic timer device for water softeners or the like. 3,976,101, Cl. 137-624.200.

Bastian, James Winslow: *See—*
Hughes, John Lawrence; Liu, Robert Chung-Huan; Enkoji, Takashi; and Bastian, James Winslow, 3,976,787.

Batcho, Andrew David; and Leimgruber, Willy, to Hoffmann-La Roche Inc. Intermediates for indoles. 3,976,639, Cl. 260-240.00D.

Bates, Clarence F.: *See—*
Barclay, Doltie W., 3,976,057.

Bates, Gerald E.: *See—*
Barclay, Doltie W., 3,976,057.

Bauer, Erich: *See—*
Schwarz, Ferdinand; and Bauer, Erich, 3,976,432.

Baumann, Dieter: *See—*
Lohse, Friedrich; Rembold, Heinz; Baumann, Dieter; and Munk, Kurt, 3,976,676.

Baumann, Hans-Peter, to Sandoz Ltd. Organic compounds. 3,976,427, Cl. 8-173.000.

Baump, Paul A.; and Marinaccio, Mario, to Greer Hydraulics, Inc. Automated parking gate and controls. 3,975,861, Cl. 49-28.000.

Bauvin, Rene. Balanced lifting beam. 3,976,202, Cl. 212-27.000.

Baxter Laboratories, Inc.: *See—*
Quick, John L.; and Wyncott, Daniel D., 3,976,073.
Regan, Bernard M., 3,976,788.

Bay, Eugene H., to McCleary, Clifton, Jr. Gasoline additive and method for making same. 3,976,438, Cl. 44-61.000.

Bayer Aktiengesellschaft: *See—*
Schnoring, Hildegard; Pampus, Gottfried; Schon, Nikolaus; and Witte, Josef, 3,976,609.
Wagner, Kuno; Eimer, Johannes; Zirner, Joachim; Raab, Rainer; and Liebsch, Dietrich, 3,976,622.

BBC Brown Boveri & Company Limited: *See—*
Liptak, Gabor; and Schuler, Roland, 3,976,901.
Sahm, Peter, 3,976,516.

Beach, Janet. Medical apparatus. 3,976,076, Cl. 128-295.000.

Beane, Frank T. Protective sleeve for corrugated drainage tubes. 3,976,578, Cl. 210-484.000.

Beard, Colin C., to Syntex (U.S.A.) Inc. 2-Substituted-1,2,4-thiadiazolo-[2,3-a]-benzimidazoles and process for their preparation. 3,976,654, Cl. 260-294.80B.

Bearden, Roby, Jr.; and Hamner, Glen Porter, to Exxon Research and Engineering Company. Combined catalytic and alkali metal hydrodesulfurization and conversion process. 3,976,559, Cl. 208-89.000.

Beatrice Foods Co.: *See—*
Ziccarelli, Salvatore F., 3,976,806.

Beaudet, Camille, to Societe d'Etudes et de Realisations Scientifiques en Abrege. Process for preparing equimolecular salt of piperazine and 1,2-diphenyl-4-butyl-3,5-dioxo pyrazolidine. 3,976,646, Cl. 260-268.00H.

Becker, Robert, to United States of America, Agriculture. Preparation of high-consistency tomato products. 3,976,805, Cl. 426-599.000.

Beckerman, Joseph William: *See—*
Elfes, Lee Eugene; and Beckerman, Joseph William, 3,975,970.

Beckers, Norman L.: *See—*
Lukes, James J.; Beckers, Norman L.; and Borror, Jack A., 3,976,705.

Beckman Instruments, Inc.: *See—*
Kehoe, Thomas J., 3,976,104.

Becton, Dickinson and Company: *See—*
Bennett, Michael C., 3,976,579.

Beech, Brian Herbert: *See—*
Matthews, Peter Charles; and Beech, Brian Herbert, 3,976,384.

Belart, Juan, to ITT Industries, Inc. Dual-circuit brake system. 3,976,171, Cl. 188-345.000.

Bell, Albert. Wheelchair having pivotable ramp for climbing curbs. 3,976,152, Cl. 180-9.000.

Bell Telephone Laboratories, Incorporated: *See—*
Barns, Robert Leroy, 3,976,535.
Bidlack, Richard Henry; Egan, Wayne Jay; and Miller, Steven Gary, 3,976,847.
Cruce, Tommy Clay; and Woodall, Ernest Joseph, 3,976,939.
Firtion, Victor Andrew; Rongved, Leif; and Saunders, Thomas Edward, 3,976,923.
Koo, James Teh-Zen, 3,976,895.
Miller, Ralph L., 3,976,839.
Scalco, Emanuele, 3,976,563.
Seidel, Harold, 3,976,958.

Bell, William A. Magnetic tile holder. 3,975,813, Cl. 29-270.000.

Bellmore-Johnson Tool Co.: *See—*
Findlay, David, 3,975,852.

Bemiss, Robert P. Method of forming, filling and closing cartons, and specific cartons therefor. 3,976,241, Cl. 229-51.0TS.

Bendix Corporation, The: *See—*
Henneman, John W.; and Hinds, Duane E., 3,976,063.
Olsen, Oliver Albert, 3,976,383.
Remus, Casimer Frank, 3,976,965.

Benecke, Theodor: *See—*
Wiebke, Gunter; Korsten, Andreas; Benecke, Theodor; and Petersen, Fritz, 3,976,829.

Benford, Jarrette Erwin. Slug-ster sight for a shotgun. 3,975,851, Cl. 42-1.00S.

Bennett, Frank C., Jr.: *See—*
Natale, Peter E.; and Bennett, Frank C., Jr., 3,976,812.

Bennett, Michael C., to Becton, Dickinson and Company. Novel assembly. 3,976,579, Cl. 210-516.000.

Bennett, Richard H.; Brockington, James W.; and Line, Lloyd E., Jr., to Texaco Inc. Process for removal of fluoride compounds from spent alkylation catalyst. 3,976,759, Cl. 423-484.000.

Benson, Richard E.: *See—*
Kerber, Dathan R.; Benson, Richard E.; and VandeWiele, John L., 3,975,889.

Benton, Samuel T., to United States of America, Energy Research and Development Administration. Fabrication of boron articles. 3,976,735, Cl. 264-125.000.

Bentzinger, Harlan A. Irrigation device. 3,976,250, Cl. 239-533.000.

Benzoni, Rene Pierre: *See—*
Fieuzal, Jean Henri; Bourgine, Louis Gaston; Jean, Andre Camille; and Benzoni, Rene Pierre, 3,976,266.

Berger, Frank: *See—*
Adam, Arlette; Berger, Frank; Chedid, Louis; Lederer, Edgar; Petit, Jean-Francois; and Ciorbaru, Rita, 3,976,544.

Berkey Photo, Inc.: *See—*
Michalski, Maksymilian, 3,976,911.

Berkoff, Charles E.; Hill, David T.; and Loev, Bernard, to SmithKline Corporation. Substituted cyano,trifluoromethylphenyl linear triazenes. 3,976,633, Cl. 260-140.00R.

Bernardi, Herbert; Lehle, Erhard; Geier, Joseph; Von Aschwege, Gerd; and Haberstroh, Markus, to G.A.O. Gesellschaft fur Automation und Organisation m.b.H. Arrangement for separating sheets of paper and the like. 3,976,291, Cl. 271-94.000.

Berry, James M.; Hauser, Anthony J.; Knuth, Kurt E.; and Ollendick, Gary B., to Teletype Corporation. Gray tone generation. 3,977,007, Cl. 346-1.000.

Berry, Robert Frank, to Dresser Industries, Inc. Mandrel locking sleeve. 3,976,134, Cl. 166-120.000.

Bertelsen, Bruce Irving: *See*—
Babinski, John Paul; Bertelsen, Bruce Irving; Raacke, Karl Heinz; Sirgo, Valdeko Harry; and Townsend, Clarence Jay, 3,976,330.

Besnyo, George Frank; and Small, Byron Lee, to Western Electric Company, Inc. Coiling and binding strand material. 3,975,883, Cl. 53-3.000.

Best, John S., to Dow Chemical Company, The. Thermal bleed for permafrost environments. 3,976,125, Cl. 165-45.000.

Betulius, Gilbert E., to Chem-Farm Inc. Hand-propelled chemical applicator. 3,976,231, Cl. 222-177.000.

Betz, Bernard K., to Honeywell Information Systems, Inc. Data communication system for transmitting data in compressed form. 3,976,844, Cl. 179-15.55R.

Bevilacqua, Frank, to Combustion Engineering, Inc. Emergency core cooling injection manifold. 3,976,834, Cl. 176-38.000.

Bhattacharya, Bhairab C. Thermal convection counter streaming sedimentation method and apparatus for controlling the sex of mammalian offspring. 3,976,197, Cl. 209-11.000.

Bialy, Jerzy J.; and Weetman, David G., to Texaco Inc. Substituted aminoalkylpropanediol and motor fuel composition containing same. 3,976,441, Cl. 44-72.000.

BICC Limited: *See*—
Newberry, John; and Ettie, Allan George Albert Edward, 3,976,259.

Bickel, John E., to United States of America, Navy. Aircraft VLF/LF/MF window antenna receiving system. 3,977,004, Cl. 343-705.000.

Bidlack, Richard Henry; Egan, Wayne Jay; and Miller, Steven Gary, to Bell Telephone Laboratories, Incorporated. Key telephone system intercom arrangement. 3,976,847, Cl. 179-99.000.

Bienstock, Daniel: *See*—
Lacey, James J.; Kurtzrock, Roy C.; and Bienstock, Daniel, 3,976,592.

Billion S.A.: *See*—
Monnet, Bernard Leon, 3,976,226.

Binard, William J.: *See*—
Dye, John F.; Binard, William J.; and Patel, Bhupendra C., 3,976,278.

Birch, William; Stuart, Roger Alexander; Facer, Robert Ian; and Durston, John Graham, to Nuclear Power Group Limited, The. Thermal insulation. 3,975,879, Cl. 52-404.000.

Birrell, Raymond Nicolson: *See*—
Combey, Malcolm; and Birrell, Raymond Nicolson, 3,976,616.

Bischkopf, Hermann, to Siemens Electrogerate GmbH. Flush-in device for an appliance such as a laundry or dishwashing machine. 3,975,931, Cl. 68-17.00R.

Bishop, Walton B., to United States of America, Navy. Friend-accept decider test simulator. 3,977,001, Cl. 343-17.700.

Bisson, Barry A.: *See*—
Shang, Jer-Yu; Bisson, Barry A.; and Wynkoop, Raymond, 3,976,437.

Bitko, Sheldon S.; and Davidoff, Charles, to Fifth Dimension Inc. Mercury switch. 3,976,960, Cl. 335-58.000.

BJ-HUGHES Inc., formerly Byron Jackson, Inc.: *See*—
Schultz, Richard A., 3,976,207.

Blackmer, Richard H.; and Hedman, Jonathan W., to General Electric Company. Vacuum extract system for a membrane oxygen enricher. 3,976,451, Cl. 55-158.000.

Blackmore, Ronald William: *See*—
Larner, Douglas Stanley; Thillainayagam, Velauthar Kopalapillai; Blackmore, Ronald William; and Hill, Barry Michael Ernest, 3,976,835.

Blair, Calvin B. Finish tools with mounting bracket therefor. 3,976,145, Cl. 172-615.000.

Blanco, Jose A.; Wortman, Gregory G.; Babjak, Juraj; and Itzkovitch, Irwin J., to International Nickel Company, Inc., The. Metal extraction process using quaternary ammonium thiocyanates. 3,976,742, Cl. 423-24.000.

Blank, Denis A.; Falkowski, Edward C.; and Pitler, Richard K., to Allegheny Ludlum Industries, Inc. Processing for grain-oriented silicon steel. 3,976,517, Cl. 148-111.000.

Bleha, William P., Jr.: *See*—
Fraas, Lewis M.; and Bleha, William P., Jr., 3,976,361.

Blenkarn, Kenneth A.; and Greenfield, William D., to Standard Oil Company (Indiana). Installation of vertically moored platform. 3,976,021, Cl. 61-89.000.

Block Engineering, Inc.: *See*—
Curbelo, Raul, 3,976,862.

Blomberg Glass: *See*—
Collier, John Philip, 3,976,317.

Bloomfield, David P., to United Technologies Corporation. Pressurized fuel cell power plant with single reactant gas stream. 3,976,507, Cl. 136-86.00R.

Blue, Maurice R. Process for cleaning and polishing a floor. 3,976,501, Cl. 134-10.000.

BMR Security Products Corporation: *See*—
Walters, Russell W., 3,976,345.

Boehringer Mannheim G.m.b.H.: *See*—
Leinert, Herbert; Popelak, Alfred; Stach, Kurt; Bartsch, Wolfgang; and Dietmann, Karl, 3,976,779.

Boeing Company, The: *See*—
Gupta, Gautam Sen, 3,976,269.
Meyer, David P.; Ellis, Gordon F.; and El-Moslimany, Mohammad A., 3,976,267.
Soualin, Richard E., 3,976,100.

Boggs, Beryl Aaron; Balint, Laszlo Joseph; Ager, Patrick William; and Buyalos, Edward Jerome, to Allied Chemical Corporation. Wiped-wall reactor. 3,976,431, Cl. 23-285.000.

Bohlke, Gunther, to Siemens Aktiengesellschaft. Shorting ring for an AC switching magnet. 3,976,964, Cl. 335-245.000.

Boliden Aktiebolag: *See*—
Dahlgren, Sven-Eric, 3,976,594.

Bolin, Mauritz. Pump drive shaft sealing arrangement. 3,976,392, Cl. 415-110.000.

Bolton, Jack C.; and Alexander, Franklin L., to Union Carbide Corporation. Closed mixing system for tending agricultural sprayers. 3,976,087, Cl. 137-15.000.

Bommer, Paul, to Zumbach Electronic-Automatic. Method and an apparatus for detecting and recording the number of phenomena. 3,977,008, Cl. 346-1.000.

Borg-Warner Corporation: *See*—
Vandevier, Joseph E.; and Ellis-Anwyl, David R., 3,976,919.

Bornhorst, Walter J.; Coleman, Steven J.; and O'Brien, James W., to Thermo Electron Corporation. Endotracheal tube holder. 3,976,080, Cl. 128-348.000.

Borror, Alan L.; and Cincotta, Louis, to Polaroid Corporation. Photosensitive compositions containing linked spectral sensitizers. 3,976,493, Cl. 96-128.000.

Borror, Alan L.; and Cincotta, Louis, to Polaroid Corporation. Bis-type quaternary salts including benzothiazole and benzimidazole rings and process for preparing dye therewith. 3,976,640, Cl. 260-240.100.

Borror, Alan L., to Polaroid Corporation. pH Sensitive dyes containing a phenolate group. 3,976,659, Cl. 260-326.150.

Borror, Jack A.: *See*—
Lukes, James J.; Beckers, Norman L.; and Borror, Jack A., 3,976,705.

Bos Kalis Westminster Group N.V.: *See*—
Andreae, Johannes Franciscus Reinardus, 3,975,842.

Bossons, Walter Howard, to Masson Scott Thrissell Engineering Limited. Web guide systems. 3,976,237, Cl. 226-97.000.

Botimer, Lloyd. Sanding device. 3,975,868, Cl. 51-358.000.

Bottaccio, Giorgio; Chiusoli, Gian Paolo; and Marchi, Marcello, to Montedison S.p.A. Process for carboxylating organic substrates with carbon dioxide in hydrocarbon solvents. 3,976,677, Cl. 260-465.00D.

Bottka, Nicholas; Teppo, Edward A.; and Rehn, Victor L., to United States of America, Navy. Tunable electroabsorptive detector. 3,976,873, Cl. 250-211.00J.

Boudeman, Robert J.: *See*—
Alexander, Carl J.; and Boudeman, Robert J., 3,976,280.

Boulet, William Paul. Dryer system. 3,976,018, Cl. 110-10.000.

Bourgine, Louis Gaston: *See*—
Fieuzal, Jean Henri; Bourgine, Louis Gaston; Jean, Andre Camille; and Benzoni, Rene Pierre, 3,976,266.

Bousaid, Issam S., to Texaco Inc. Recovery of oil by a combination of low temperature oxidation and hot water or steam injection. 3,976,137, Cl. 166-272.000.

Bouton, James. Sports complex. 3,975,869, Cl. 52-9.000.

Bowden, Charles J.: *See*—
Smith, William E.; and Bowden, Charles J., 3,975,908.

Bowden, Keith Romilly Roskrudge, to Rosemount Engineering Company Limited. Multi-channel control systems. 3,976,981, Cl. 340-172.500.

Bowen, Duane C.; and Doan, Troy L. Bathing facility incorporating bathroom air exhaust fans. 3,975,780, Cl. 4-146.000.

Bowser, David Eugene: *See*—
Engstrom, Ralph Warren; and Bowser, David Eugene, 3,976,875.

Box, Leonard J.: *See*—
Lee, Eugene T.; and Box, Leonard J., 3,976,421.

Boyd, Durrell D.; and Childs, Lewis B., to United States of America, Air Force. Method of coating boron particles with ammonium perchlorate. 3,976,521, Cl. 149-5.000.

Brachet, Alain, to Electricite de France (Service National). Method for detecting steam leakage in heat-exchanger having circulation tubes surrounded by liquid sodium and devices for the application of said method. 3,975,943, Cl. 73-40.000.

Braitberg, Michael F.; and Lee, Tzuo-Chang, to Honeywell Inc. Holographic memory with moving memory medium. 3,976,354, Cl. 350-3.500.

Brakel, Kornelius, to Robert Bosch G.m.b.H. Hydraulic control arrangement. 3,976,097, Cl. 137-596.130.

Bramley, Donald; Davies, Gerald Thomas; and Watson, David, to Imperial Chemical Industries Limited. Setting apparatus. 3,975,807, Cl. 28-1.600.

Branson, Donald M.; and Klitzke, Kermit A. Rodent trap. 3,975,857, Cl. 43-61.000.

Braun, Louis G. Gate lock. 3,976,315, Cl. 292-104.000.

Brawn, Peter Nelson. Intermittent pressure pneumatic stocking. 3,976,056, Cl. 128-24.00R.

Brechlin, Alfred: *See*—
Herrmann, Heinz; and Brechlin, Alfred, 3,976,583.

Breckner, Gerald; Donahue, Charles R.; Hage, C. Herbert; and Williams, Philip J., to GF Business Equipment, Inc. Drawer locking mechanism. 3,976,343, Cl. 312-219.000.

Breen, Max; and Kardas, James R., to American Stovalator Corporation. Heat exchanger. 3,976,047, Cl. 126-121.000.

Brekle, Oliver R., to M & B Metal Products Company. Method for cleaning and coating rod. 3,976,815, Cl. 427-292.000.

Breslov, Khanon Yakovlevich: *See*—
Kalnin, Igor Martynovich; Tsirlin, Beniamin Lvovich; Bukhter, Elena Zalmanovna; Terenina, Alexandra Dmitrievna; Eremkina, Galina Ivanovna; Poteiko, Andrei Ivanovich; and Breslov, Khanon Yakovlevich, 3,976,395.

Breveteam S.A.: *See*—
Muller, Jean-Pierre, 3,975,859.

Bridgestone Tire Company Limited: *See*—
Inouye, Sakae; Kurahashi, Suminobu; Wada, Norio; Kikuchi, Motokazu; Masuda, Kinji; Akiyama, Tsuneharu; and Osaki, Toshiyuki, 3,976,624.

British Petroleum Company Limited, The: *See*—
Eyles, Martin Keith, 3,976,561.

British Secretary of State for Defence: *See*—
Irving, Leonard David; Pattison, James Edward; and Rees, Huw David, 3,977,015.

Brocker, Dale C. Signal control apparatus. 3,976,876, Cl. 250-227.000.

Brockington, James W.: *See*—
Bennett, Richard H.; Brockington, James W.; and Line, Lloyd E., Jr., 3,976,759.

Broder, Leonard J. Logic learning apparatus. 3,975,836, Cl. 35-30.000.

Brooker, Leslie G. S.; Fumia, Arthur, Jr.; and Heseltine, Donald W., to Eastman Kodak Company. Pyrrolo hemioxonol. 3,976,661, Cl. 260-326.5SF.

Brown, Clifford S. Modular shelving apparatus. 3,976,014, Cl. 108-64.000.

Brown, Elwood B., to Rexnord Inc. Two-lobed conveyor balls. 3,976,177, Cl. 193-37.000.

Brown, Kenard D. Liquid vortex vacuum pump. 3,976,453, Cl. 55-222.000.

Brown Oil Tools, Inc.: *See*—
Allen, Richard Glenn, 3,976,133.

Brown, Wilburn Kelly, to Pettibone Corporation. Cooling-controlled tank for hydraulic fluid. 3,976,124, Cl. 165-35.000.

Bruer, James Dudley, to International Business Machines Corporation. Loader carrier mechanism. 3,976,300, Cl. 274-1.00R.

Brugger, Robert M.: *See*—
Miller, Lowell G.; Young, Robert C.; and Brugger, Robert M., 3,976,888.

Brunelle, Joseph A.; Maszle, George J.; and Scudder, Thomas J., to Xerox Corporation. Corona stabilization arrangement. 3,976,880, Cl. 250-324.000.

Brungraber, Robert J., to United States of America, Commerce. Portable tester for measuring the static coefficient of friction between a floor surface or the like and a shoe sole or heel material or the like. 3,975,940, Cl. 73-9.000.

Brunnett, Carl J.; Cox, Jerome R., Jr.; Snyder, Donald L.; and Mattson, Rodney A., to Picker Corporation. Tomography system having non-concurrent, compound axial scanning. 3,976,885, Cl. 250-445.00T.

Buchanan, John K., to Motorola, Inc. Pre-conditioning circuits for MOS integrated circuits. 3,976,892, Cl. 307-205.000.

Bucher-Guyer AG Maschinenfabrik: *See*—
Hauser, Hans Ulrich; and Hartmann, Eduard, 3,976,415.

Buchner, Robert Bertold; and Maat, Jan Philippus, to U.S. Philips Corporation. MFC receiver digital signal processing. 3,976,843, Cl. 179-15.0BY.

Buckler, Ernest Jack; and Richmond, Michael Hugh, to Polysar Limited. Filled thermoplastic. 3,976,608, Cl. 260-4.0AR.

Buckman Laboratories, Inc.: *See*—
Buckman, Stanley J.; Fenyes, Joseph G. E.; Pera, John D.; and Wienert, Lester A., 3,976,495.

Buckman, Stanley J.; Fenyes, Joseph G. E.; Pera, John D.; and Wienert, Lester A., to Buckman Laboratories, Inc. Methods of inhibiting the growth and proliferation of fungi using 3',5'-dihalo-4'-hydroxyacetophenone. 3,976,495, Cl. 106-15.00R.

Buix, Louis F.; Gribnitz, Harry J.; and Hohner, Gary A., to Quaker Oats Company, The. Apparatus for providing endless succession of compartmented trays. 3,976,208, Cl. 214-6.00H.

Bukhter, Elena Zalmanovna: *See*—
Kalnin, Igor Martynovich; Tsirlin, Beniamin Lvovich; Bukhter, Elena Zalmanovna; Terenina, Alexandra Dmitrievna; Eremkina, Galina Ivanovna; Poteiko, Andrei Ivanovich; and Breslov, Khanon Yakovlevich, 3,976,395.

Bullock, Kenneth W.: *See*—
Grimes, Eldon L.; and Bullock, Kenneth W., 3,975,797.

Bulova Watch Company, Inc.: *See*—
Crescas, Charles; Weisman, Sorrell; and Sharf, Joseph, 3,976,011.

Bumpus, Francis Merlin; Khosla, Mahesh Chandra; and Smeby, Robert Rudolph. Sar'-(OMe)Thr^8 Angiotensin II as an angiotensin II antagonist. 3,976,770, Cl. 424-177.000.

Bunker Ramo Corporation: *See*—
Keglewitsch, Josef, 3,976,350.

Burr, Robert C.: *See*—
Fanta, George F.; and Burr, Robert C., 3,976,552.

Burroughs Corporation: *See*—
Wallace, Harry L., 3,976,290.

Burrows, Leonard H.: *See*—
Smith, Jack R.; Burrows, Leonard H.; Heiser, Richard S.; Hertz, Richard J.; Pesavento, Joseph A.; Reuther, John F.; Shields, James J.; and Yannone, Robert A., 3,975,902.

Burton, Aubrey T.: *See*—
Canup, Robert E.; and Burton, Aubrey T., 3,976,043.

Burton, Edward E. Pick-up truck loading ramp. 3,976,209, Cl. 214-85.000.

Buyalos, Edward Jerome: *See*—
Boggs, Beryl Aaron; Balint, Laszlo Joseph; Ager, Patrick William; and Buyalos, Edward Jerome, 3,976,431.

C.A.V. Limited: *See*—
Jarrett, Boaz Antony, 3,976,249.

C. J. Kennedy Company: *See*—
Kennedy, Charles J., 3,976,262.

Cadillac Products, Inc.: *See*—
James, Albert L., 3,976,528.

Cagle, Harlan R., to Sahlin International, Inc. Lift control system for press unloader or the like. 3,975,992, Cl. 92-129.000.

Cairns, Thomas M.: *See*—
Baldyga, Joseph W.; and Cairns, Thomas M., 3,976,235.

Calcaterra, Bernard Jacob; Ogg, Harold Edward, Jr.; and Osborne, James Herschell, to Caterpillar Tractor Co. Adjustable master setting gauge. 3,975,828, Cl. 33-165.000.

Callan, John E., to Cities Service Company. Method for producing a two component polymeric tape. 3,976,530, Cl. 156-306.000.

Cam Gears Limited: *See*—
Adams, Frederick John, 3,975,964.

Camp, Ronnie W.: *See*—
Ball, Dean M.; Camp, Ronnie W.; Hendrix, Warren P.; and Orr, Clyde, Jr., 3,975,946.

Campbell, Alleyne Resue, to RCA Corporation. Calculator timer with simple base-6 correction. 3,976,867, Cl. 235-169.000.

Canadian Cane Equipment Ltd.: *See*—
Tilby, Sydney Edward; Mason, William C. W.; and Hodge, Donald William, 3,976,498.
Tilby, Sydney Edward, 3,976,499.

Candaian Hurricane Equipment Ltd: *See*—
Larson, Dale Leonard Milton, 3,976,393.

Canon Kabushiki Kaisha: *See*—
Ando, Yujiro; Ohara, Katsunobu; and Tanaka, Keiji, 3,976,484.
Kawakubo, Kazuo; Takahashi, Isao; and Sugiura, Susumu, 3,976,373.
Mashimo, Yukio, 3,976,913.

Canton Textile Mills, Inc.: *See*—
Sullins, John K., 3,976,575.

Canup, Robert E.; and Burton, Aubrey T., to Texaco Inc. Means and method for controlling the occurrence and the duration of time intervals during which sparks are provided in a multicylinder internal combustion engine. 3,976,043, Cl. 123-148.00E.

Capitol Products Corporation: *See*—
Goss, Lorane C., Jr., 3,975,875.

Caporiccio, Gerardo; and Bargigia, Gianangelo, to Montedison S.p.A. Fluorinated elastomeric polymers containing the 1,3,5-triazine ring, and process for preparing same. 3,976,603, Cl. 260-2.00R.

Cappotto, Samuel D., to SCM Corporation. Automatic function mechanism for typewriters. 3,976,182, Cl. 197-91.000.

Cappotto, Samuel D., to SCM Corporation. Ribbon cartridge for dual automatic typewriter function. 3,976,184, Cl. 197-151.000.

Carl Schenck AG: *See*—
Guyot, Volker; Holdinghausen, Paul; and Mueller, Martin, 3,976,947.

Carlisle, Richard S. Methods for producing filled containers. 3,975,885, Cl. 53-29.000.

Carlnas, Bengt Erik; and Sundvall, Bror Christer Ingemar. Sensing device. 3,976,089, Cl. 137-83.000.

Carlson, Richard D., to Hooker Chemicals & Plastics Corporation. Polymer compositions containing adduct of hexahalocyclopentadiene and bicyclononadiene. 3,976,722, Cl. 260-880.00R.

Carman, Wilson H., Jr., to Amoco Production Company. Power auger seismic source. 3,976,161, Cl. 181-116.000.

Carmelo, Maniglia. Low-temperature melting metals spray-gun. 3,976,247, Cl. 239-135.000.

Carn, Patrick. Process for molding a pneumatic tire having a wide bearing surface. 3,976,739, Cl. 264-219.000.

Carnes, W. Robert, Jr.; Selnick, Lester L.; and Balogh, John, Jr., to Pitney-Bowes, Inc. Method and apparatus for sorting currency. 3,976,198, Cl. 209-111.7OT.

Carr, George W., to Pullman Incorporated. Landing gear mounting bracket. 3,976,310, Cl. 280-766.000.

Carroll, Stephen C. Portable outdoor grill. 3,975,999, Cl. 99-449.000.

Carrow, Guy E.; and Rees, Robert L., to Phillips Petroleum Company. Rotationally molding a multilayered article. 3,976,821, Cl. 428-474.000.

Carstensen, Kenneth J.: *See*—
Hauk, Thomas D.; and Carstensen, Kenneth J., 3,975,945.

Carswell, Larry G.: *See*—
Murray, John R.; Heer, Harvey W.; and Carswell, Larry G., 3,976,272.

Carter, Frank A., to Ershig's, Inc. Method for making fiber reinforced resin tank forming mandrel. 3,975,816, Cl. 29-446.000.

Carter-Wallace, Inc.: *See*—
Jass, Herman E.; and Kohlhepp, Frederick F., 3,976,223.

Cartmell, James Vernon: *See*—
Monter, Robert Paul; Hall, Albert Moore; and Cartmell, James Vernon, 3,976,055.

Carty, Daniel T.: *See*—
Williams, Alan D.; Powell, John A.; Carty, Daniel T.; and Oline, James A., 3,976,723.

Casa Herrera, Inc.: *See—*
Herrera, Frank J.; and Ponce, Rodger G., 3,976,188.

Casiello, Nicholas F.: *See—*
Moudry, George M.; Moudry, Nancy Lee; Casiello, Nicholas F.; and Marino, Anthony V., 3,976,234.

Catagnus, Philip C.; and Baker, Charles T., to Texas Instruments Incorporated. Passivation of mercury cadmium telluride semiconductor surfaces by anodic oxidation. 3,977,018, Cl. 357-30.000.

Catchpole, Brian George, to Commonwealth of Australia, The. Detection of surface ice accretion. 3,976,270, Cl. 244-134.00F.

Caterpillar Tractor Co.: *See—*
Allen, Jan K., 3,976,210.
Calcaterra, Bernard Jacob; Ogg, Harold Edward, Jr.; and Osborne, James Herschell, 3,975,828.
Clark, Ralph B.; and Anderson, Howard R., 3,976,154.
Dennison, Thomas M., 3,976,404.
Godfrey, William H., 3,976,323.
Grawey, Charles E.; Untz, Robert W.; Koch, Keith E.; and Gekhardt, Charles F., 3,976,116.
Lacher, Thomas F., Jr.; Grob, Russel W.; and Gardner, William J., 3,975,952.
Miller, Calvin L., 3,976,164.
Shaffer, Walter M., 3,976,158.
Simmons, Gerald P., 3,975,984.
Vaughn, Kennith E., 3,976,337.
Walker, Donald F., 3,975,866.

Catto, Kenneth A., to Telephonax, Inc. Reversible tape drive apparatus. 3,976,236, Cl. 226-50.000.

Caveney, Jack E.; Moody, Roy A.; Fulton, Ronald T.; and Rehling, Charles J., to Panduit Corporation. Automatic cable tie installation tool. 3,976,108, Cl. 140-93.00A.

CBS Inc.: *See—*
Glenn, William E., 3,976,830.

CCL Systems Limited: *See—*
Kerr, Robert Michael, 3,975,799.

Cejka, Joseph B., to Ward Products Corporation. Antenna base assembly. 3,977,005, Cl. 343-715.000.

Celanese Corporation: *See—*
Scott, Robert H.; and Gaulding, Dan L., 3,976,595.

Center for New Product Development: *See—*
McLaughlin, James Hugh, 3,976,588.

Central Soya Company, Inc.: *See—*
Young, Larry L.; Horn, Herbert; and Endres, Joseph G., 3,976,798.

Chaffin, Frank R., to W. S. Shamban & Co. Precision lead screw assembly and nut. 3,975,968, Cl. 74-441.000.

Chakrabarti, Paritosh M., to GAF Corporation. Monoesters derived from ethoxylated higher alcohols and thiodisuccinic acid as detergent builders. 3,976,586, Cl. 252-89.00R.

Chalk, Ronald C.: *See—*
Dogliotti, Libera M.; Chalk, Ronald C.; Spano, Leo A.; and Sieling, Dale H., 3,976,466.

Chambless, Joe G.; and Freeman, John W., to ACF Industries, Incorporated. Packing means for a wellhead assembly. 3,976,130, Cl. 166-84.000.

Champan, Louis W., to Melco. Telephone wiring tester. 3,976,849, Cl. 179-175.250.

Chand, Ramesh: *See—*
Marcote, Roland; Eisenberg, Steve; Chand, Ramesh; and Haase, Herman, 3,976,450.

Chang, David R., to General Electric Company. Metal of improved environmental resistance. 3,976,436, Cl. 29-196.600.

Chang, Yu-chieh: *See—*
Minck, Robert W.; Weber, Neill; and Chang, Yu-chieh, 3,976,503.

Charpentier, Jean G. Airport transfer vehicle. 3,976,166, Cl. 187-19.000.

Chau, Yuk Bun; and Stinson, Willis David, Jr., to Fairchild Camera and Instrument Corporation. Testing circuit. 3,976,940, Cl. 324-73.00R.

Chedid, Louis: *See—*
Adam, Arlette; Berger, Frank; Chedid, Louis; Lederer, Edgar; Petit, Jean-Francois; and Ciorbaru, Rita, 3,976,544.

Chem-Farm Inc.: *See—*
Betulius, Gilbert E., 3,976,231.

Chemetron Corporation: *See—*
Moore, Donald G., 3,976,961.
Van Horn, Charles A., 3,976,852.

Chemische Werke Huls Aktiengesellschaft: *See—*
Hoffmann, Gunthard; and Striebeck, Achim, 3,976,666.
Turck, Ulrich, 3,976,626.

Chervenak, Michael C.: *See—*
Shen, John; and Chervenak, Michael C., 3,976,557.

Chestnov, Valery Fedorovich; and Ivankin, Dmitry Petrovich. Method of and apparatus for assembling electric lamp prongs within a glass envelope. 3,976,461, Cl. 65-59.00A.

Chevalier, Philippe; and Seeman, Bronislav, to Schlumberger Technology Corporation. Natural gamma ray spectrum analysis technique. 3,976,878, Cl. 250-253.000.

Chevron Research Company: *See—*
Suzuki, Shigeto, 3,976,699.
Wilkes, John B., 3,976,703.

Chicago Pneumatic Tool Company: *See—*
Silvern, David H.; and Minton, Stanley J., 3,976,390.

Childs, Lewis B.: *See—*
Boyd, Durrell D.; and Childs, Lewis B., 3,976,521.

Chinai, Kays; and Amend, Alfred, to Personal Products Company. Tampon blank with reduced sloughing properties. 3,976,075, Cl. 128-285.000.

Chisso Corporation: *See—*
Ando, Masao, 3,975,819.

Chiusoli, Gian Paolo: *See—*
Bottaccio, Giorgio; Chiusoli, Gian Paolo; and Marchi, Marcello, 3,976,677.

Chore-Time Equipment, Inc.: *See—*
Ramser, Forrest L.; and Skinner, Mark, 3,976,032.

Christie, Stuart Melville; and Shepherd, Alexander Turnbull, to Ferranti Limited. Presettable multi-stage binary-coded decimal counters. 3,976,859, Cl. 235-92.0PE.

Christophel, Reuben L., to Shenandoah Manufacturing Co. Inc. Gas fuel control system for multiple brooder installations. 3,976,243, Cl. 236-6.000.

Christopher, Albert S.: *See—*
Tufts, Robert J.; and Christopher, Albert S., 3,975,914.

Chrysler Corporation: *See—*
Colley, Larry Leroy, 3,976,341.

Ciba-Geigy AG: *See—*
Hauri, Rene; and Misslin, Raphael Charles, 3,976,246.

Ciba-Geigy Corporation: *See—*
Combey, Malcolm; and Birrell, Raymond Nicolson, 3,976,616.
Lohse, Friedrich; Rembold, Heinz; Baumann, Dieter; and Munk, Kurt, 3,976,676.
Nagarajan, Kuppuswamy; Arya, Vishwa Prakash; and George, Thomas, 3,976,778.

Cimarusti, Christopher M.: *See—*
Varma, Ravi K.; and Cimarusti, Christopher M., 3,976,637.
Varma, Ravi K.; and Cimarusti, Christopher M., 3,976,638.

Cincotta, Louis: *See—*
Borror, Alan L.; and Cincotta, Louis, 3,976,493.
Borror, Alan L.; and Cincotta, Louis, 3,976,640.

Ciorbaru, Rita: *See—*
Adam, Arlette; Berger, Frank; Chedid, Louis; Lederer, Edgar; Petit, Jean-Francois; and Ciorbaru, Rita, 3,976,544.

Cipher, John A.; and Lorang, Malcolm M., to Texas Instruments Incorporated. Phase lock loop AM/FM receiver. 3,976,943, Cl. 325-317.000.

Citation Manufacturing Company, Inc.: *See—*
Farque, Clade Anthony, 3,976,151.

Cities Service Company: *See—*
Callan, John E., 3,976,530.

Citizen Watch Co., Ltd.: *See—*
Kasama, Noriyuki, 3,975,896.

Clark Equipment Company: *See—*
Kraus, Peter B., 3,975,990.
Wahnemuehl, Edgar, 3,976,157.

Clark, Harold A., to Dow Corning Corporation. Paint compositions. 3,976,497, Cl. 106-287.0SE.

Clark, Henry: *See—*
Hodgson, Robert J.; and Clark, Henry, 3,976,201.

Clark, John Colin; and Elks, Joseph, to Glaxo Laboratories Limited. Production of an ester of one enantiomer of an α-amino acid in the form of a salt with an optically active acid. 3,976,680, Cl. 260-471.00A.

Clark, Paul D., to Delbar Products, Inc. Mirror head adjusting mechanism. 3,976,275, Cl. 248-487.000.

Clark, Ralph B.; and Anderson, Howard R., to Caterpillar Tractor Co. Drive line differential apparatus for a vehicle. 3,976,154, Cl. 180-24.050.

Clark, William R., to I-T-E Imperial Corporation. False triggering protection for ground fault sensor. 3,976,918, Cl. 317-18.00D.

Claudius Peters AG: *See—*
Heidebroek, Reinhard H. H., 3,976,232.

Cleland, Charles E., to Continental Machines, Inc. Direct coupled way system for movable head band saw machines. 3,975,978, Cl. 83-796.000.

Clements, Walter M.: *See—*
Wood, William W.; Greenwood, James E.; and Clements, Walter M., 3,976,064.

Cleveland, Spencer; and Coury, Fred F., to Cleveland, Spencer. Portable securities selector system. 3,976,840, Cl. 179-2.0DP.

Clymer, Bonita E., special administratrix: *See—*
Clymer, Joseph D., deceased, 3,975,887.

Clymer, Joseph D., deceased (by Clymer, Bonita E., special administratrix), to Lincoln Manufacturing Company, Inc. Control device for conveyor. 3,975,887, Cl. 53-373.000.

Cobe Laboratories, Inc.: *See—*
White, Robert Lee, 3,976,574.

Cobelli, Mario, to Multibrev Anstalt. Wrist-watch bracelet. 3,976,233, Cl. 224-4.00E.

Cochran, Michael J., to Texas Instruments Incorporated. Prompting calculator. 3,976,975, Cl. 340-172.500.

Coffman, Fredrick M.: *See—*
Johnson, Keith O.; and Coffman, Fredrick M., 3,975,949.

Coggins, B. Frank, Jr. Stone cutting machine. 3,976,045, Cl. 125-12.000.

Cohen, Sheldon S., to Modern Medical Concepts, Inc. Sealed package of swab or applicator stick and medicinal material to be applied thereby. 3,976,195, Cl. 206-362.000.

Coja, Joachim; von Eckardstein, Karl-Ernest; and Meinken, Bernhard, to Friedrich Wilhelm Schwing GmbH. Apparatus for the distribution of concrete. 3,976,092, Cl. 137-343.000.

Cole, James D. Automatic, temperature responsive damper assembly. 3,976,245, Cl. 236-93.00A.

Coleman, Steven J.: *See—*
Bornhorst, Walter J.; Coleman, Steven J.; and O'Brien, James W., 3,976,080.

Coles, Gerald Christopher; and Landquist, Justus Kenneth, to Imperial Chemical Industries Limited. Method of treatment of liver fluke infections. 3,976,784, Cl. 424-324.000.

Colgate-Palmolive Company: *See—*
Fitzgerald, Harry G.; and Patience, Donald, 3,976,074.
Nachtigal, Julius Harvey, 3,976,765.

Colley, Larry Leroy, to Chrysler Corporation. Seal. 3,976,341, Cl. 308-187.100.

Collier, John Philip, to Blomberg Glass. Strike plate construction for sliding glass door or window lock. 3,976,317, Cl. 292-340.000.

Collins, James R., to General Electric Company. Bridge transistor inverter circuit. 3,976,932, Cl. 321-45.00R.

Colpoys, Patrick Joseph, Jr.; and Neel, Eugene Allen, Jr., to Union Carbide Corporation. Method of increasing permeability in subsurface earth formation. 3,976,138, Cl. 166-280.000.

Combey, Malcolm; and Birrell, Raymond Nicolson, to Ciba-Geigy Corporation. Bis(phosphate) plasticizers and plasticized compositions. 3,976,616, Cl. 260-30.60R.

Combustion Engineering, Inc.: *See—*
Bevilacqua, Frank, 3,976,834.
Stiteler, Fred Zwald; and Donohue, James Phillip, 3,976,541.

Cominco Ltd.: *See—*
Geiger, Kenneth Daniel; Horvath, Steven Joseph; Niessen, Paul; and Seymour, Theodore Joseph, 3,976,405.
Landucci, Louis; McKay, Donald Roderick; and Parker, Ernest George, 3,976,743.

Commercial Shearing, Inc.: *See—*
Friedrichs, Ingo, 3,975,993.

Commonwealth of Australia, The: *See—*
Catchpole, Brian George, 3,976,270.

Commonwealth Scientific and Industrial Research Organization: *See—*
Hayward, Malcolm Edwin; and Maier, Volker Elmar, 3,976,629.

Compagnie Honeywell Bull (Societe Anonyme): *See—*
Rodier, Rene Jean, 3,976,929.

Condon, Edward: *See—*
Ondetti, Miguel Angel; and Condon, Edward, 3,976,660.

Connick, William J., Jr.; and Ellzey, Samuel E., Jr., to United States of America, Agriculture. Polyfluorinated amine oil-repellent, stain-release fabric treatment. 3,976,818, Cl. 427-381.000.

Consan Pacific Incorporated: *See—*
Saurenman, Donald G., 3,976,916.

Conti, Jack, to Dresser Industries, Inc. Corrosion resistant Bourdon tube. 3,975,967, Cl. 73-411.000.

Continental Can Company, Inc: *See—*
Szpitalak, Wesley J., 3,976,187.

Continental Machines, Inc.: *See—*
Cleland, Charles E., 3,975,978.

Conway, Alvin C., to Riker Laboratories, Inc. Antiemetic method. 3,976,774, Cl. 424-250.000.

Cooke, Milton M., Jr.: *See—*
Cooke, Milton M., Sr.; and Cooke, Milton M., Jr., 3,976,347.

Cooke, Milton M., Sr.; and Cooke, Milton M., Jr. Electrical connector and method. 3,976,347, Cl. 339-35.000.

Corbett, Michael J.; and Topolski, Alvin S., to Wurlitzer Company, The. Record selector mechanism for a phonograph system. 3,976,301, Cl. 274-10.00D.

Cornelius, Gail, to R. M. Wade & Co. Pipe coupling apparatus. 3,976,093, Cl. 137-344.000.

Corver, Hans A.; and Robertson, Allan J., to American Cyanamid Company. Manufacture of water-insoluble ammonium polyphosphate. 3,976,752, Cl. 423-305.000.

Cory Food Services, Inc.: *See—*
Vitous, Charles J., 3,975,996.

Costello, Edward: *See—*
Stella, Carl; and Costello, Edward, 3,976,869.

Cotton, Herbert John Thomas, to Lucas Electrical Company Limited, The. Slip ring assembly for A.C. machines. 3,976,903, Cl. 310-232.000.

Coulter Electronics, Inc.: *See—*
Ginsberg, Guenter, 3,976,429.

Coulter Information Systems, Inc.: *See—*
Von Hartel, Herbert, 3,976,555.

Coury, Fred F.: *See—*
Cleveland, Spencer; and Coury, Fred F., 3,976,840.

Cox, David A.; Barnish, Ian T.; and Evans, Anthony G., to Pfizer Inc. Method of stimulating the heart employing ureido substituted phenyl-alkanolamine, alkylamine and α-aminoalkyl ketone derivatives. 3,976,783, Cl. 424-322.000.

Cox, Jerome R., Jr.: *See—*
Brunnett, Carl J.; Cox, Jerome R., Jr.; Snyder, Donald L.; and Mattson, Rodney A., 3,976,885.

Cox, Mervyn K., to Cox, Mervyn K. Method of applying orthopedic splints. 3,976,062, Cl. 128-87.00R.

Cox, Roger G., to Hewlett-Packard Company. Frequency synthesizer. 3,976,945, Cl. 328-14.000.

Cragoe, Edward J., Jr.; and Woltersdorf, Otto W., Jr., to Merck & Co., Inc. [1,3-Dioxo-2-substituted and 2,2-disubstituted- indanyloxy (or thio] alkanoic acids. 3,976,681, Cl. 260-473.00F.

Cragoe, Edward J., Jr.; and Woltersdorf, Otto W., Jr., to Merck & Co., Inc. [1-Oxo-2,3-hydrocarbylene-5-indanyloxy(or thio)]alkanoic acids. 3,976,686, Cl. 260-520.00C.

Cranab Aktiebolag: *See—*
Jonsson, Bror Allan, 3,976,111.

Crane, Jacob; and Shapiro, Eugene, to Olin Corporation. High conductivity high temperature copper alloy. 3,976,477, Cl. 75-153.000.

Cremers, Freddie J.: *See—*
Alfenaar, Marinus; and Cremers, Freddie J., 3,976,755.

Crescas, Charles; Weisman, Sorrell; and Sharf, Joseph, to Bulova Watch Company, Inc. Inertial arming device for a fuse. 3,976,011, Cl. 102-70.20R.

Crest Nicholson Limited: *See—*
Fillery, Gordon Thomas, 3,976,024.

Criscimagna, Tony N.; and Steinmetz, Michael J., to International Business Machines Corporation. Gas display panel with light pen. 3,976,992, Cl. 340-324.00M.

Crocker, Nathan E. Hose bib selector valve with hose draining feature. 3,976,102, Cl. 137-625.470.

Crosby, Edward L., Jr., to United States of America, Air Force. Tethered balloon mooring means. 3,976,268, Cl. 244-115.000.

Crosby, Guy A.; and DuBois, Grant E., to Dynapol. Sweetener derivatives. 3,976,687, Cl. 260-520.00C.

Crosby, Guy A.; and DuBois, Grant E., to Dynapol. Ionic dihydrochalcone sweeteners and food product containing the same. 3,976,790, Cl. 426-3.000.

Croslin, Michael E., to Technicon Instruments Corporation. Manual fluid sampler with overstroke. 3,975,960, Cl. 73-425.600.

Cross, William G.: *See—*
Shale, Correll C.; and Cross, William G., 3,976,747.

Crossley, Roger: *See—*
Curran, Adrian Charles Ward; and Crossley, Roger, 3,976,683.

Cruce, Tommy Clay; and Woodall, Ernest Joseph, to Bell Telephone Laboratories, Incorporated. Conductor identification in multiconductor cables. 3,976,939, Cl. 324-66.000.

Cuthy, Denis G.; Hung, Wendell L. Y.; and Heath, Jon M., to Deltak Corporation. Vertical firetube waste heat boiler. 3,976,033, Cl. 122-7.00R.

Cumings, Francis J.: *See—*
Kevorkian, Victor; and Cumings, Francis J., 3,976,548.

Cummings, Kenneth R., to Lawrence Peska Associates, Inc., a part interest. Personal speaker system. 3,976,162, Cl. 181-141.000.

Cunningham, Kelly G. Auger. 3,976,147, Cl. 173-22.000.

Cuomo, Salvatore Ralph, Jr., to International Business Machines Corporation. Semiconductor wafer dicing fixture. 3,976,288, Cl. 269-21.000.

Cuq, Bernard Paul: *See—*
Tuffet, Pierre Edmond; Cuq, Bernard Paul; and Margot, Jean, 3,976,970.

Curbelo, Raul, to Block Engineering, Inc. Flow stream processor. 3,976,862, Cl. 235-151.340.

Curran, Adrian Charles Ward; and Crossley, Roger, to John Wyeth & Brother Limited. α-Amino substituted thioacetamides. 3,976,683, Cl. 260-501.190.

Curran, Adrian Charles Ward, to John Wyeth & Brother Limited. Piperazine diones. 3,976,773, Cl. 424-250.000.

Cushing, Darrell D., to Deerfield Plastics Co., Inc. Method of employing a high percentage of reground thermoplastic scrap resin in an extruder. 3,976,730, Cl. 264-37.000.

Cutler-Hammer, Inc.: *See—*
Miersch, Horst K., 3,977,006.

Czotscher, Ernst: *See—*
Junghans, Rudi; and Czotscher, Ernst, 3,976,007.

Dahlem, Francis E., to American Air Filter Company, Inc. Apparatus for cleaning a dirty gas stream. 3,976,455, Cl. 55-226.000.

Dahlgren, Sven-Eric, to Boliden Aktiebolag. Preservative for wood and other organic material subject to biological deterioration and containing amine-forming metals, polyphosphate and chlorinating phenols. 3,976,594, Cl. 252-400.00A.

Daimler-Benz Aktiengesellschaft: *See—*
Lehmann, Adolf, 3,976,324.
Trachte, Kurt; Willingshofer, Walter; and Kleinschmit, Einhard, 3,976,338.

Daiwa Spinning Co., Ltd.: *See—*
Suzuki, Yoshihisa, 3,975,894.

Danell, Curt; Holmer, Bo Gunnar; and Rodhe, Peder Magnus, to Telefonaktiebolaget L M Ericsson. Method for transmitting pictures at a picture telephone transmission having limited bandwidth. 3,976,831, Cl. 178-6.800.

Daviditz, John C., to Mobil Oil Corporation. Zeolite synthesis. 3,976,598, Cl. 252-455.00Z.

Davidoff, Charles: *See—*
Bitko, Sheldon S.; and Davidoff, Charles, 3,976,960.

Davies, Gerald Thomas: *See—*
Bramley, Donald; Davies, Gerald Thomas; and Watson, David, 3,975,807.

Davies, Thomas D. Refrigeration system for controlled heating using rejected heat of an air conditioner. 3,976,123, Cl. 165-29.000.

Davis, James E.: *See—*
Hartke, Francis J.; and Davis, James E., 3,976,593.

Dawson, Ronald John, to GKN Forgings Limited. Mechanical handling apparatus. 3,976,204, Cl. 214-1.0BB.

Day, Winterton U.: *See—*
Dunning, Charles E.; and Day, Winterton U., 3,976,734.

Dayco Corporation: *See—*
Speer, Billy L., 3,975,965.

Dean, George A., to Dean Research Corporation. Sheet material handling apparatus. 3,976,321, Cl. 294-81.00R.

Dean Research Corporation: *See—*
Dean, George A., 3,976,321.
Dearden, Brian; and Shepherd, Geoffrey, to Ferranti Limited. Pulse-frequency sensitive switching circuit arrangement. 3,976,948, Cl. 328-138.000.
Deerfield Plastics Co., Inc.: *See—*
Cushing, Darrell D., 3,976,730.
Deininger, Rolf; and Wolf, Erich, to Klosterfrau Berlin GmbH. Process for the manufactue of biscuits. 3,976,800, Cl. 426-311.000.
de Kanter, Hendrik, to GRW & Associates, Inc. Chlorinator having trip device actuated by line pressure difference. 3,976,220, Cl. 222-57.000.
Delap, Joseph A., to Phillips Petroleum Company. Reactivation of organochromium olefin polymerization catalyst in presence of oxygen. 3,976,632, Cl. 526-113.000.
Delbar Products, Inc.: *See—*
Clark, Paul D., 3,976,275.
Delgado, Manuel M.; and Delgado, Paul A. Composite cast structure and process for manufacture of same. 3,976,009, Cl. 102-7.600.
Delgado, Paul A.: *See—*
Delgado, Manuel M.; and Delgado, Paul A., 3,976,009.
Deltak Corporation: *See—*
Csathy, Denis G.; Hung, Wendell L. Y.; and Heath, Jon M., 3,976,033.
Demag Aktiengesellschaft: *See—*
Grimpe, Karl, 3,975,923.
Raab, Stefan, 3,976,120.
Dennison, Thomas M., to Caterpillar Tractor Co. Lubrication of compression seals in rotary engines. 3,976,404, Cl. 418-88.000.
De Nora, Oronzio; and De Nora, Vittorio, to Oronzio de Nora Implanti Elettrochimici S.p.A. Horizontal, planar, bipolar diaphragm cells. 3,976,550, Cl. 204-98.000.
De Nora, Vittorio; and Polata, Bohumil, to Signetics Corporation. Method for reducing the defect density of an integrated circuit utilizing ion implantation. 3,976,512, Cl. 148-1.500.
De Nora, Vittorio, to Oronzio de Nora Impianti Elettrochimici S.p.A. Electrolysis cell. 3,976,556, Cl. 204-262.000.
De Nora, Vittorio: *See—*
De Nora, Oronzio; and De Nora, Vittorio, 3,976,550.
Derby, Howard L.; Epina, August P.; Olmsted, Dennis R.; Platter, Sanford; and Herger, Zoltan L., to Storage Technology Corporation. Compliant tape cleaner for magnetic recording tapes. 3,975,789, Cl. 15-306.00A.
DeSimone, Robert S., to Rhodia, Inc. Process for preparing methyl heptenone. 3,976,700, Cl. 260-593.00R.
Desjarlais, Robert C., to Scott Paper Company. Diazo compositions and diazotype materials prepared from same. 3,976,491, Cl. 96-91.00R.
DeSoto, Inc.: *See—*
Sekmakas, Kazys, 3,976,615.
Desourdy, Bernard. Grader. 3,976,146, Cl. 172-788.000.
DeTommasi, Arthur N., to General Electric Company. Voltage responsive switches and methods of making. 3,976,811, Cl. 427-58.000.
Develop KG/Dr. Eisbein and Co.: *See—*
Moser, Kurt; and Weigele, Reinhold, 3,976,371.
Diamond Die & Mold Co.: *See—*
Baldyga, Joseph W.; and Cairns, Thomas M., 3,976,235.
Diamond, Julius; and Douglas, George H., to William H. Rorer, Inc. Guanidines. 3,976,643, Cl. 260-247.50R.
Diamond Shamrock Corporation: *See—*
Lukes, James J.; Beckers, Norman L.; and Borror, Jack A., 3,976,705.
Diebold, Incorporated: *See—*
Ekama, Peter J.; Hansen, Kenneth R.; and Barnett, Charles B., 3,976,264.
Diehl, Robert Eugene; Schrider, Michael Stanley; and Kantor, Sidney, to American Cyanamid Company. Dioxocyclohexanecarboxanilide insecticides and acaricides. 3,976,785, Cl. 424-324.000.
Dietmann, Karl: *See—*
Leinert, Herbert; Popelak, Alfred; Stach, Kurt; Bartsch, Wolfgang; and Dietmann, Karl, 3,976,779.
Diguet, Daniel: *See—*
Lebailly, Jacques; and Diguet, Daniel, 3,977,016.
Dillinger, Edward George, to Kemos, Incorporated. Machine and method of operation thereof for producing non-woven "glued" carpets. 3,976,531, Cl. 156-361.000.
DiPietro, Carmelo V. Deep fat fryer. 3,975,997, Cl. 99-407.000.
Doan, Troy L. Hanging of sliding doors. 3,975,862, Cl. 49-409.000.
Doan, Troy L.: *See—*
Bowen, Duane C.; and Doan, Troy L., 3,975,780.
Dodson, Osborne C.: *See—*
Osborn, Merritt A.; and Dodson, Osborne C., 3,975,969.
Dogliotti, Amilcare, to P. Ferrero & C. S.p.A. Container for holding flat parallelipipedic articles. 3,976,193, Cl. 206-72.000.
Dogliotti, Libera M.; Chalk, Ronald C.; Spano, Leo A.; and Sieling, Dale H., to United States of America, Army. Fertilizer made from nitrocellulose and process of making same. 3,976,466, Cl. 71-25.000.
Donahue, Charles R.: *See—*
Breckner, Gerald; Donahue, Charles R.; Hage, C. Herbert; and Williams, Philip J., 3,976,343.
Donohue, James Phillip: *See—*
Stiteler, Fred Zwald; and Donohue, James Phillip, 3,976,541.
Doolittle, Donald B., to All American Industries, Inc. Semibuoyant composite aircraft. 3,976,265, Cl. 244-2.000.
Dotson and Evans Inc.: *See—*
Dotson, George, 3,975,867.
Dotson, George, to Dotson and Evans Inc. Hand-held gem dop. 3,975,867, Cl. 51-229.000.
Dougherty, Nathan S., Jr.; and Anderson, Charles F., to United States of America, Air Force. Edgetone suppression device for wind tunnel walls. 3,975,955, Cl. 73-147.000.
Douglas, Clarence J., to Ozark-Mahoning Company. Recarbonation process and apparatus. 3,976,445, Cl. 55-68.000.
Douglas, Edward Curtis: *See—*
Wu, Chung Pao; Douglas, Edward Curtis; and Mueller, Charles William, 3,976,377.
Douglas, George H.: *See—*
Diamond, Julius; and Douglas, George H., 3,976,643.
Douglas, Larry J.; and Wenger, Charles B., to Marathon Oil Company. Optimizing petroleum recovery micellar systems utilizing zeta potential. 3,976,582, Cl. 252-8.55D.
Dover Corporation: *See—*
Kaiser, Danny K., 3,976,577.
Dow Chemical Company, The: *See—*
Best, John S., 3,976,125.
Elms, W. Jay; and Klein, Dieter H., 3,976,614.
Frank, Harold G., 3,976,724.
Havens, Carl B., 3,976,733.
Hovey, William P.; and Kubiak, James J., 3,976,526.
Leathers, Joel M., 3,976,418.
McGregor, Stanley D.; and Senkbeil, Herman O., 3,976,644.
Thomas, Mary R.; Lalk, Robert H.; Evani, Syamalarao; and Schmidt, Donald L., 3,976,822.
Dow Corning Corporation: *See—*
Clark, Harold A., 3,976,497.
Dowell, Robert D. Coating for metal surfaces and method for application. 3,976,809, Cl. 427-34.000.
Dowty Rotol Limited: *See—*
Hunt, John Owen, 3,976,397.
Dreitzler, David R.; and Thorn, Lawrence B., to United States of America, Army. Circuit for determining the fire-no-fire characteristics of electroexplosive devices. 3,975,942, Cl. 73-35.000.
Dresser Industries, Inc.: *See—*
Alcock, Keith, 3,976,456.
Berry, Robert Frank, 3,976,134.
Conti, Jack, 3,975,967.
DuBois, Grant E.: *See—*
Crosby, Guy A.; and DuBois, Grant E., 3,976,687.
Crosby, Guy A.; and DuBois, Grant E., 3,976,790.
Dubois, Jean Claude; Zann, Annie; and Lavenu, Jean Claude, to Thomson-CSF. Novel chemical substance presenting a nematic liquid phase. 3,976,591, Cl. 252-299.000.
Dudko, Daniil Andreevich; Samsonov, Grigory Valentinovich; Maximovich, Boleslav Ivanovich; Zelenin, Vitaly Ivanovich; Klimanov, Alexandr Sergeevich; Potseluiko, Vladimir Nikolaevich; Trunov, Gennady Vasilievich; and Sleptsov, Vasily Mikhailovich. Wear-resistant composite material. 3,976,481, Cl. 75-171.000.
Duffy, James J.: *See—*
Golborn, Peter; and Duffy, James J., 3,976,620.
Dukess, Joseph. Cap liner construction. 3,976,217, Cl. 215-329.000.
Dumont, Mark. Needle reinforcing means for small gauge hypodermic needles. 3,976,070, Cl. 128-221.000.
Dunning, Charles E.; and Day, Winterton U., to Kimberly-Clark Corporation. Method for forming air formed adhesive bonded webs. 3,976,734, Cl. 264-89.000.
Du Pont de Nemours, E. I., and Company: *See—*
English, Daniel R., 3,976,515.
Hammer, Clarence Frederick; and Starkweather, Howard Warner, Jr., 3,976,720.
Hecht, James Lee, 3,976,810.
Matrisian, Robert Michael, 3,976,240.
Middleton, William Joseph, 3,976,691.
Vasta, Joseph A., 3,976,617.
Durfee, Daniel G.: *See—*
Yamamoto, Mayjue A., 3,976,168.
Durkan, Gerald. Digital fluidic ventilator. 3,976,065, Cl. 128-145.800.
Durston, John Graham: *See—*
Birch, William; Stuart, Roger Alexander; Facer, Robert Ian; and Durston, John Graham, 3,975,879.
Dye, John F.; Binard, William J.; and Patel, Bhupendra C., to Kendall Company, The. Valve assembly. 3,976,278, Cl. 251-149.600.
Dynamit Nobel Aktiengesellschaft: *See—*
Vollkommer, Norbert, 3,976,623.
Dynapol: *See—*
Crosby, Guy A.; and DuBois, Grant E., 3,976,687.
Crosby, Guy A.; and DuBois, Grant E., 3,976,790.
Furia, Thomas E., 3,976,797.
Dynatech Corporation: *See—*
Sadek, Safik E., 3,976,071.
Dzus Fastener Co., Inc.: *See—*
Schenk, Peter, 3,975,804.
E. R. Squibb & Sons, Inc.: *See—*
Narayanan, Venkatachala Lakshmi, 3,976,657.
Ondetti, Miguel Angel; and Condon, Edward, 3,976,660.
Varma, Ravi K.; and Cimarusti, Christopher M., 3,976,637.
Varma, Ravi K.; and Cimarusti, Christopher M., 3,976,638.
Eastling, George E. Slow speed steering control for jet-powered water craft. 3,976,026, Cl. 115-12.00R.

Eastman Kodak Company: *See—*
Brooker, Leslie G. S.; Fumia, Arthur, Jr.; and Heseltine, Donald W., 3,976,661.
Groner, Carl F., 3,976,485.
Natale, Peter E.; and Bennett, Frank C., Jr., 3,976,812.

Eaton, Lyle E.; and Hyler, John H., to Westinghouse Air Brake Company. Twin flow modulated torque converter. 3,975,906, Cl. 60-347.000.

Eberly, Paul E., Jr., to Exxon Research and Engineering Company. Hydrodesulfurization with alcohol addition. 3,976,562, Cl. 208-216.000.

Ebert, Michael: *See—*
Reick, Franklin G., 3,976,572.

Eder, Ulrich; Haffer, Gregor; Ruppert, Jurgen; Sauer, Gerhard; and Wiechert, Rudolf, to Schering Aktiengesellschaft. Process for the preparation of 9,10-secoestrane derivatives. 3,976,701, Cl. 260-611.00A.

Edwards, Albert, to Baker Perkins Holdings Limited. Jaw crushers. 3,976,255, Cl. 241-264.000.

Edwards, Clarence Roy; and Nolan, John James, to General Electric Company. Apparatus for maintaining a constant surface speed of a rotating work piece being cut by a moving cutting tool. 3,976,861, Cl. 235-151.110.

Efremidi, Anatoly Lazarevich; and Saralidze, Anton Lavrentievich. Installation for electrostatic precipitation. 3,976,449, Cl. 55-139.000.

Egan, Wayne Jay: *See—*
Bidlack, Richard Henry; Egan, Wayne Jay; and Miller, Steven Gary, 3,976,847.

Egbert, William E., to Hewlett-Packard Company. Digital DC motor speed control circuit. 3,976,926, Cl. 318-331.000.

Egli, Ernst; and Thomas, Larry A., to Standard Oil Company (Indiana). Die restrictions to obtain smooth surfaces on foam extrudates. 3,976,419, Cl. 425-467.000.

Ehata, Senzou: *See—*
Noguchi, Tadamasa; Matsuura, Masao; and Ehata, Senzou, 3,976,023.

Eickmann, Karl. Radial piston machine with pivoted connection between piston and piston shoes. 3,975,988, Cl. 91-492.000.

Eifler, Robert H.: *See—*
Olson, Robert D.; and Eifler, Robert H., 3,976,793.

Eimer, Johannes: *See—*
Wagner, Kuno; Eimer, Johannes; Zirner, Joachim; Raab, Rainer; and Liebsch, Dietrich, 3,976,622.

Eisai Co., Ltd.: *See—*
Watanabe, Sumio; Kayano, Masanori; Ishino, Yoshio; and Miyao, Kohei, 3,976,764.

Eiselen, Everett Truman, to International Business Machines Corporation. Apparatus for image manipulation. 3,976,982, Cl. 340-172.500.

Eisenberg, Robert M.; and Myles, Walter E., to Singer Company, The. Simulated flame torch. 3,975,834, Cl. 35-1.000.

Eisenberg, Steve: *See—*
Marcote, Roland; Eisenberg, Steve; Chand, Ramesh; and Haase, Herman, 3,976,450.

Ekama, Peter J.; Hansen, Kenneth R.; and Barnett, Charles B., to Diebold, Incorporated. Pneumatic tube system swing tube terminal construction. 3,976,264, Cl. 243-19.000.

Ekholm, Rolf G.: *See—*
Gullichsen, Johan E.; and Ekholm, Rolf G., 3,976,538.

Electra-Tronics, Inc.: *See—*
Parkinson, Thomas F., 3,976,891.

Electricite de France (Service National): *See—*
Brachet, Alain, 3,975,943.

Electro Fuel, Inc.: *See—*
Johnson, Glen E., 3,976,726.

Electronic Flag Poles, Inc.: *See—*
Schmit, Theodore F., 3,976,283.

Elektro-Physik, Hans Nix & Dr.-Ing. E. Steingroever KG: *See—*
Steingroever, Erich, 3,976,935.

Elektro-Thermit GmbH: *See—*
Finck, Herbert, 3,976,239.

Elektroschmelzwerk Kempten GmbH: *See—*
Wiebke, Gunter; Korsten, Andreas; Benecke, Theodor; and Petersen, Fritz, 3,976,829.

Elfes, Lee Eugene; and Beckerman, Joseph William, to Massey-Ferguson Inc. Multi throw selector mechanism using pivoted links. 3,975,970, Cl. 74-473.00R.

Eli Lilly and Company: *See—*
Fields, Calvin H.; and Hirsch, Clarence A., 3,976,674.

Elkem-Spigerverket: *See—*
Krogsrud, Harald, 3,976,727.

Elks, Joseph: *See—*
Clark, John Colin; and Elks, Joseph, 3,976,680.

Ellis-Anwyl, David R.: *See—*
Vandevier, Joseph E.; and Ellis-Anwyl, David R., 3,976,919.

Ellis, Gordon F.: *See—*
Meyer, David P.; Ellis, Gordon F.; and El-Moslimany, Mohammad A., 3,976,267.

Ellison, Wallace D. Portable power digging tool. 3,975,843, Cl. 37-86.000.

Ellzey, Samuel E., Jr.: *See—*
Connick, William J., Jr.; and Ellzey, Samuel E., Jr., 3,976,818.

El-Moslimany, Mohammad A.: *See—*
Meyer, David P.; Ellis, Gordon F.; and El-Moslimany, Mohammad A., 3,976,267.

Elms, W. Jay; and Klein, Dieter H., to Dow Chemical Company, The. Inherrently water-dispersible, selfcrosslinking interpolymers useful as coatings. 3,976,614, Cl. 260-29.4UA.

EMI Limited: *See—*
Voles, Roger; and Watts, Simon, 3,976,998.

Empire Oil Tool Company: *See—*
Garrison, Marion A., 3,976,408.

Endres, Joseph G.: *See—*
Young, Larry L.; Horn, Herbert; and Endres, Joseph G., 3,976,798.

Energystics Corporation: *See—*
Schalow, Rudolph D.; and Link, John T., 3,976,985.

Eng, Joseph W.; and Lin, Stanley C. F., to Lin Eng Corporation. Electrostatic and sonic gas processing apparatus. 3,976,448, Cl. 55-122.000.

Engel, Alfred, to Engel, Alfred. Optimal decoder for non-stationary signals. 3,976,863, Cl. 235-152.000.

Engelhard Minerals & Chemicals Corporation: *See—*
Pfefferle, William C., 3,975,900.

Enger, Thomas Arthur, to International Business Machines Corporation. Error detector for an associative directory or translator. 3,976,865, Cl. 235-153.0AK.

England, John W., III; and Wright, Jeffery E. Apparatus for metal rule die embossing and staining. 3,976,004, Cl. 101-26.000.

English, Daniel R., to Du Pont de Nemours, E. I., and Company. Low-fuming fluxes. 3,976,515, Cl. 148-26.000.

Engstrom, Ralph Warren; and Bowser, David Eugene, to RCA Corporation. Photodetector filter structure. 3,976,875, Cl. 250-226.000.

Enkoji, Takashi: *See—*
Hughes, John Lawrence; Liu, Robert Chung-Huan; Enkoji, Takashi; and Bastian, James Winslow, 3,976,787.

Enthone, Incorporated: *See—*
Fadgen, Earl J., Jr., 3,976,500.
Fadgen, Earl J., Jr.; and Hajdu, Juan, 3,976,816.

Enzlin, Theodoor Henri; and Smulders, Walter Henricus Maria Magdala, to U.S. Philips Corporation. Semiconductor device, method of manufacturing same and circuit arrangement comprising the device. 3,977,020, Cl. 357-51.000.

Epina, August P.: *See—*
Derby, Howard L.; Epina, August P.; Olmsted, Dennis R.; Platter, Sanford; and Herger, Zoltan L., 3,975,789.

Erdei, Karoly. Apparatus for testing material strength. 3,975,950, Cl. 73-94.000.

Eremkina, Galina Ivanovna: *See—*
Kalnin, Igor Martynovich; Tsirlin, Beniamin Lvovich; Bukhter, Elena Zalmanovna; Terenina, Alexandra Dmitrievna; Eremkina, Galina Ivanovna; Poteiko, Andrei Ivanovich; and Breslov, Khanon Yakovlevich, 3,976,395.

Erickson, Byron Ted; and Hilton, Howard Thorndike, to International Business Machines Corporation. Dual sensor for multi-nozzle ink jet. 3,977,010, Cl. 346-75.000.

Erickson, Donald C. Gas generator and enhanced energy conversion systems. 3,975,913, Cl. 60-645.000.

Erickson, Doris, executor: *See—*
Erickson, Henry, deceased; and Erickson, Doris, executor, 3,976,560.

Erickson, Henry, deceased; and by Erickson, Doris, executor, to Atlantic Richfield Company. Hydrocarbon conversion process. 3,976,560, Cl. 208-138.000.

Ericson, Kenneth R.; and Smith, Ernest S., to Procter & Gamble Company, The. Collapsible dispensing tubes. 3,976,224, Cl. 222-107.000.

Ericsson, Bjorn: *See—*
Jysky, Goran; Mardla, Ilmar; and Ericsson, Bjorn, 3,975,831.

Eriksson, Leif; and Thornell, Lennart, to Allmanna Svenska Elektriska Aktiebolaget. Filtering arrangement for relay protection devices. 3,976,920, Cl. 317-49.000.

Erlichman, Irving, to Polaroid Corporation. Exposure control system employing a blade position sensor. 3,977,012, Cl. 354-29.000.

Ernsthausen, Roger E., to Owens-Illinois, Inc. Stress-balanced coating composite for dielectric surface of gas discharge device. 3,976,823, Cl. 428-539.000.

Ershig's, Inc.: *See—*
Carter, Frank A., 3,975,816.

Ershov, Boris Nikolaevich: *See—*
Alien, Imant Karlovich; Avdeev, Ivan Ivanovich; Gelfandbein, Yakov Aronovich; Ershov, Boris Nikolaevich; Nikonenko, Anatoly Vasilievich; Popov, Jury Olegovich; Khesin, Arkady Yakovlevich; and Yanson, Boris Albertovich, 3,976,827.

Erwin, Ransome W., to Austral-Erwin Engineering Co. Heat exchangers and evaporators. 3,976,537, Cl. 159-23.000.

Esch, Abner S. Tile laying cart. 3,976,155, Cl. 280-32.500.

Esterline Corporation: *See—*
Mayfield, Glenn A., 3,976,942.

Estes, Roger Q. Disposable noise reducing hearing aid attachment. 3,976,848, Cl. 179-107.00R.

Etat Francais: *See—*
Fieuzal, Jean Henri; Bourgine, Louis Gaston; Jean, Andre Camille; and Benzoni, Rene Pierre, 3,976,266.

Ethyl Corporation: *See—*
Fanning, Robert J., 3,976,670.

Ettie, Allan George Albert Edward: *See—*
Newberry, John; and Ettie, Allan George Albert Edward, 3,976,259.

Etwell, Cecil Charles. Sugar cane planter. 3,976,214, Cl. 214-519.000.

Evani, Syamalarao: *See—*
Thomas, Mary R.; Lalk, Robert H.; Evani, Syamalarao; and Schmidt, Donald L., 3,976,822.
Evans, Anthony G.: *See—*
Cox, David A.; Barnish, Ian T.; and Evans, Anthony G., 3,976,783.
Evans, Howard F. Nasopharyngeal speculum. 3,976,054, Cl. 128-4.000.
Evans Products Company: *See—*
Spaeth, Irvin J., 3,976,170.
Evans, Robert T.: *See—*
Farley, David L.; and Evans, Robert T., 3,976,136.
Evolution SA: *See—*
Lang, Erich, 3,976,261.
Exxon Nuclear Company, Inc.: *See—*
Johnson, Keith O.; and Coffman, Fredrick M., 3,975,949.
Exxon Production Research Company: *See—*
Shaughnessy, Christopher M.; and Salathiel, William M., 3,976,140.
Exxon Research and Engineering Company: *See—*
Bearden, Roby, Jr.; and Hamner, Glen Porter, 3,976,559.
Eberly, Paul E., Jr., 3,976,562.
Salvesen, Robert H.; Malloy, Paul L.; Bartley, Erle E.; and Meyer, RoNel M., 3,976,766.
Eyles, Martin Keith, to British Petroleum Company Limited, The. Desulphurization catalysts and their use. 3,976,561, Cl. 208-216.000.
Fabel, Arthur J., to Metco, Inc. Powder feed device for flame spray guns. 3,976,332, Cl. 302-57.000.
Faber, Walter; and Schmieg, Gerhard, to Siemens Aktiengesellschaft. Multiple purpose plug arrangement. 3,976,850, Cl. 200-51.100.
Fabian, Wolfgang; and Schrempp, Klaus, to BASF Aktiengesellschaft. Production of easily dispersible, high tinctorial strength perylene-3,4,9,10-tetracarboxylic acid diimides. 3,976,649, Cl. 260-281.00P.
Facer, Robert Ian: *See—*
Birch, William; Stuart, Roger Alexander; Facer, Robert Ian; and Durston, John Graham, 3,975,879.
Fadgen, Earl J., Jr., to Enthone, Incorporated. Method for dissolving non-ferrous metals. 3,976,500, Cl. 134-2.000.
Fadgen, Earl J., Jr.; and Hajdu, Juan, to Enthone, Incorporated. Activation of surfaces intended for electroless plating. 3,976,816, Cl. 427-304.000.
Fairchild Camera and Instrument Corporation: *See—*
Chau, Yuk Bun; and Stinson, Willis David, Jr., 3,976,940.
Falk, Detlef: *See—*
Lange, Gerhard; and Falk, Detlef, 3,976,874.
Falkowski, Edward C.: *See—*
Blank, Denis A.; Falkowski, Edward C.; and Pitler, Richard K., 3,976,517.
Falvo, Ralph, to Hooker Chemicals & Plastics Corporation. Electrolysis method. 3,976,549, Cl. 204-1.00R.
Fanning, Robert J., to Ethyl Corporation. Chemical process for producing esters from olefins. 3,976,670, Cl. 260-410.90R.
Fanshawe, David Geoffrey James, to U.S. Philips Corporation. Snap action mechanical-electrical piezoelectric transducer. 3,976,899, Cl. 310-8.300.
Fanta, George F.; and Burr, Robert C., to United States of America, Agriculture. Water-soluble graft polymers produced by an outwardly dry radiation polymerization process. 3,976,552, Cl. 204-159.120.
Fanta, Wayne I., to Procter & Gamble Company, The. Certain cyclopropane carboxylic acid esters of 2,3-dihyrobenzofuran-3-ols. 3,976,663, Cl. 260-346.20R.
Farley, David L.; and Evans, Robert T., to Halliburton Company. Pressure operated isolation valve for use in a well testing apparatus and its method of operation. 3,976,136, Cl. 166-264.000.
Farlind, Stig Axel Goran, to Stece - AB Industrifjadrar. Belt strap adjusting devices. 3,975,800, Cl. 24-196.000.
Farque, Clade Anthony, to Citation Manufacturing Company, Inc. Self-propelled golf cart. 3,976,151, Cl. 180-6.500.
Farr, Glyn Phillip Reginald, to Girling Limited. Vehicle brake pressure control valves for use in dual pressure systems. 3,976,334, Cl. 303-6.00C.
Farrington, Gregory C.; and Roth, Walter L., to General Electric Company. Sealed lithium-iodine cell. 3,976,504, Cl. 136-83.00R.
Farrington, Gregory C.; and Roth, Walter L., to General Electric Company. Sealed lithium-bromine cell. 3,976,505, Cl. 136-83.00R.
Fay, Philip S.: *See—*
Loder, Wallace R., Jr.; Fay, Philip S.; and Veatch, Franklin, 3,976,439.
Loder, Wallace R., Jr.; Fay, Philip S.; and Veatch, Franklin, 3,976,440.
Fay, Terrence P.: *See—*
Paris, Wayne H.; Wolfe, Ronald C.; Fay, Terrence P.; and Lindquist, Robert D., 3,976,736.
Feinstein, Allen; and Fields, Ellis K., to Standard Oil Company (Indiana). 1,3-Adamantylene-bis-trimellitate dianhydrides. 3,976,665, Cl. 260-346.300.
Feng, Bai-Cwo, to International Business Machines Corporation. Planarization of integrated circuit surfaces through selective photoresist masking. 3,976,524, Cl. 156-8.000.
Fenyes, Joseph G. E.: *See—*
Buckman, Stanley J.; Fenyes, Joseph G. E.; Pera, John D.; and Wienert, Lester A., 3,976,495.
Ferranti Limited: *See—*
Christie, Stuart Melville; and Shepherd, Alexander Turnbull, 3,976,859.
Dearden, Brian; and Shepherd, Geoffrey, 3,976,948.
F'Geppert, Erwin, to United States of America, Army. Brake. 3,976,172, Cl. 192-8.00R.
Fiber Bond Corporation: *See—*
Mednick, Edward, 3,976,525.
Fields, Calvin H.; and Hirsch, Clarence A., to Eli Lilly and Company. Aluminum salts of substituted phenylalkanoic acids. 3,976,674, Cl. 260-448.00R.
Fields, Ellis K.: *See—*
Feinstein, Allen; and Fields, Ellis K., 3,976,665.
Fieni, Walter, to Societe Anonyme Francaise du Ferodo. Safety belt assembly for a motor vehicle. 3,976,305, Cl. 280-744.000.
Fieuzal, Jean Henri; Bourgine, Louis Gaston; Jean, Andre Camille; and Benzoni, Rene Pierre, to Etat Francais. Missile with cruciform guidance system. 3,976,266, Cl. 244-3.210.
Fifth Dimension Inc.: *See—*
Bitko, Sheldon S.; and Davidoff, Charles, 3,976,960.
Fillery, Gordon Thomas, to Crest Nicholson Limited. Boat hatches with dual espagnolette bolts for hinging and locking. 3,976,024, Cl. 114-203.000.
Fillion, Pierre C.; and Vicentini, Gilles P., to Societe Anonyme: Poclain. Fluid motor braking system. 3,976,333, Cl. 303-2.000.
Financial Mining - Industrial and Shipping Corporation: *See—*
Gambopoulos, Theodor; and Nestoridis, Antony, 3,976,251.
Finck, Herbert, to Elektro-Thermit GmbH. Process for reconditioning worn frogs. 3,976,239, Cl. 228-119.000.
Findlay, David, to Bellmore-Johnson Tool Co. Signal launcher. 3,975,852, Cl. 42-40.000.
Finike Italiana Marposs-Soc. In Accomandita Semplice di Mario Possati & C.: *See—*
Possati, Mario, 3,975,829.
Firestone Tire & Rubber Company, The: *See—*
Halasa, Adel F.; and Tate, David P., 3,976,628.
Haw, Sherwood Gordon, 3,975,915.
Firmenich & Cie: *See—*
Winter, Max; Gautschi, Fritz; Flament, Ivon; Stoll, Max; and Goldman, Irving M., 3,976,802.
Firtion, Victor Andrew; Rongved, Leif; and Saunders, Thomas Edward, to Bell Telephone Laboratories, Incorporated. Pattern generating apparatus. 3,976,923, Cl. 318-128.000.
Fischer, Adolf, to BASF Aktiengesellschaft. Herbicide mixture of lower alkyl esters of N-benzoyl-N-chlorophenyl-2-amino-lower alkanoic acids and 3-lower alkyl-2,1,3-benzothiadiazinone-(4)-2,2-dioxides or salts thereof. 3,976,468, Cl. 71-91.000.
Fischer, Harry F., Jr., to All-State Industries, Inc. Sheet metal batten roof or siding. 3,975,880, Cl. 52-464.000.
Fitzgerald, Harry G.; and Patience, Donald, to Colgate-Palmolive Company. Absorbent article. 3,976,074, Cl. 128-284.000.
Flament, Ivon: *See—*
Winter, Max; Gautschi, Fritz; Flament, Ivon; Stoll, Max; and Goldman, Irving M., 3,976,802.
Flatau, Carl R. Articulated master slave manipulator. 3,976,206, Cl. 214-1.0CM.
Fleischhacker, James Earl; Nicholas, Vincent; and Wasserlein, Henry George, Jr., to AMP Incorporated. Apparatus for applying wire connecting devices to pairs of wires. 3,975,812, Cl. 29-203.0MW.
Fleischmann, David L.: *See—*
Fleischmann, Lester K.; Kenney, William J.; and Fleischmann, David L., 3,976,183.
Fleischmann, Lester K.; Kenney, William J.; and Fleischmann, David L., to Standard Manifold Company. Typewriter ribbon supply adapter for replaceable ribbons. 3,976,183, Cl. 197-151.000.
Fletcher, Gerald M.: *See—*
Goel, Narendra S.; and Fletcher, Gerald M., 3,976,370.
Flicker, Paul L. Instrument for use in orthopedic surgery. 3,975,821, Cl. 30-124.000.
Fohl, Artur. Safety belt pull-in device. 3,976,257, Cl. 242-55.000.
Folser, Karl: *See—*
Plasser, Franz; Theurer, Josef; and Folser, Karl, 3,976,142.
Ford Motor Company: *See—*
Labana, Santokh S.; and Theodore, Ares N., 3,976,715.
Labana, Santokh S.; and Theodore, Ares N., 3,976,716.
Labana, Santokh S.; and Theodore, Ares N., 3,976,717.
Labana, Santokh S.; and Theodore, Ares N., 3,976,718.
Labana, Santokh S.; and Theodore, Ares N., 3,976,719.
Minck, Robert W.; Weber, Neill; and Chang, Yu-chieh, 3,976,503.
Patel, Chhotubhai N.; and Scofield, Donald W., 3,976,128.
Fork, Kurt, to Kraftwerk Union Aktiengesellschaft. Protection device for a power plant to prevent overloading in the event of short circuits. 3,976,917, Cl. 317-13.00R.
Forrer, Homer W., to Mead Corporation, The. Method of forming and loading an article carrier. 3,975,884, Cl. 53-26.000.
Fortescue, Peter, to General Atomic Company. Fuel element having variable orifice. 3,976,542, Cl. 176-43.000.
Foseco International Limited: *See—*
Hawthorne, Peter Frederick, 3,976,728.
Fouquet-Werke Frauz & Planck, Firma: *See—*
Mickeler, Karl; and Schall, Moritz, 3,975,927.
Fox Pool Corporation: *See—*
Witte, Donald H.; and Weir, Donald H., 3,975,874.
Fraas, Lewis M.; and Bleha, William P., Jr., to Hughes Aircraft Company. Charge storage diode with graded defect density photocapacitive layer. 3,976,361, Cl. 350-160.0LC.
Franaszek, Tadeusz: *See—*
Motyczynski, Ryszard; Franaszek, Tadeusz; Kurzydlo, Mieczyslaw; and Polaczek, Jerzy, 3,976,422.

Frank, Harold G., to Dow Chemical Company, The. Blends of acid-containing copolymers and copolymers of acrylonitrile and a conjugated diolefin. 3,976,724, Cl. 260-889.000.

Franklin, James G.: *See—*
Gasser, Rupert J.; and Franklin, James G., 3,976,804.

Franz Plasser Bahnbaumaschinen-Industrie Gesellschaft m.b.H.: *See—*
Plasser, Franz; Theurer, Josef; and Folser, Karl, 3,976,142.

Franzen, Gustav, to Palitex Project-Company G.m.b.H. Pneumatically operated yarn threading mechanisms for textile yarn processing machine. 3,975,893, Cl. 57-34.00R.

Frazier, James L., to Houdaille Industries, Inc. Fluid-actuated tool changer with dual axis of rotation. 3,975,817, Cl. 29-568.000.

Freed, Meier E.; and Potoski, John R., to American Home Products Corporation. Benzobicycloalkanone oximes. 3,976,693, Cl. 260-566.00A.

Freed, Meier E.; and Potoski, John R., to American Home Products Corporation. Benzobicycloalkane amines. 3,976,696, Cl. 260-571.000.

Freeman, John W.: *See—*
Chambless, Joe G.; and Freeman, John W., 3,976,130.

Fregeolle, Oscar, to Alba-Waldensian, Incorporated. Thigh length anti-embolism stocking and method of knitting same. 3,975,929, Cl. 66-172.00E.

Fried. Krupp Gesellschaft mit beschrankter Haftung: *See—*
Meuser, Wilfried, 3,976,969.

Friedrich Unde GmbH: *See—*
Hegner, Gerhard, 3,976,203.

Friedrich Wilhelm Schwing GmbH: *See—*
Coja, Joachim; von Eckardstein, Karl-Ernest; and Meinken, Bernhard, 3,976,092.

Friedricha, Ingo, to Commercial Shearing, Inc. Piston-rod unit for hydraulic machines. 3,975,993, Cl. 92-129.000.

Frydman, Georges. Assembly system for furniture panels. 3,976,344, Cl. 312-263.000.

Fuji Photo Film Co., Ltd.: *See—*
Hinata, Masanao; Takei, Haruo; Sato, Akira; and Ikeda, Tadashi, 3,976,492.
Kubotera, Kikuo; Mizuki, Eiichi; Kawano, Hideo; and Fujiwara, Tadahiro, 3,976,487.
Mukaida, Yoshito; and Tsuboi, Masayoshi, 3,976,817.
Ohtsuka, Shyuichi; and Taguchi, Seiichi, 3,977,009.

Fuji Photo Optical Co., Ltd.: *See—*
Toyama, Seiji; and Yoshikawa, Kazuo, 3,976,363.

Fujimoto, Yukio, to URO Denshi Kogyo Kabushiki Kaisha. Ultrasonic wave type alarm device. 3,976,988, Cl. 340-258.00A.

Fujino, Nobukatsu; Yamanaka, Kazuo; and Harada, Takeo, to Sumitomo Metal Industries, Ltd. Method for judging the fitness of a steel composition to a casting practice. 3,976,513, Cl. 148-2.000.

Fujisawa Pharmaceutical Co., Ltd.: *See—*
Itoh, Masumi, 3,976,635.

Fujitsu Ltd.: *See—*
Hirose, Tadatsugu; Urade, Toshinori; and Yamaguchi, Hisashi, 3,976,993.
Motegi, Masanori; Uchida, Keiichiro; Koshino, Minoru; Muraoka, Takatoshi; and Nagasawa, Shigeru, 3,976,866.

Fujiwara, Tadahiro: *See—*
Kubotera, Kikuo; Mizuki, Eiichi; Kawano, Hideo; and Fujiwara, Tadahiro, 3,976,487.

Fukawa, Isaburo: *See—*
Satake, Kunio; Yamada, Tsuyoshi; Sakamoto, Kuniaki; Hayakawa, Kiyoshi; and Fukawa, Isaburo, 3,976,721.

Fuller, Willard A., to Hooker Chemicals & Plastics Corporation. Production of chlorine dioxide. 3,976,758, Cl. 423-478.000.

Fullton, James McFerrin, Jr., to Western Electric Company, Inc. Method and apparatus for generating line-by-line picture signal from transformed subpicture information. 3,976,826, Cl. 178-6.000.

Fulton, Ronald T.: *See—*
Caveney, Jack E.; Moody, Roy A.; Fulton, Ronald T.; and Rehling, Charles J., 3,976,108.

Fumia, Arthur, Jr.: *See—*
Brooker, Leslie G. S.; Fumia, Arthur, Jr.; and Heseltine, Donald W., 3,976,661.

Furia, Edoardo, to Solis S.r.l. Process for the forming of a collant article or the like with a two opposite cylinders circular hosiery machine. 3,975,924, Cl. 66-14.000.

Furia, Thomas E., to Dynapol. Low corrosion azo colorants. 3,976,797, Cl. 426-131.000.

G.A.O. Gesellschaft fur Automation und Organisation m.b.H.: *See—*
Bernardi, Herbert; Lehle, Erhard; Geier, Joseph; Von Aschwege, Gerd; and Haberstroh, Markus, 3,976,291.

Gadbois, Robert H. Releasable fishing hook. 3,975,856, Cl. 43-36.000.

GAF Corporation: *See—*
Chakrabarti, Paritosh M., 3,976,586.

Gambopoulos, Theodor; and Nestoridis, Antony, to Financial Mining - Industrial and Shipping Corporation. Separation of magnesite from its contaminants by reverse flotation. 3,976,251, Cl. 241-20.000.

Gapp, Roland Howard; Toosky, Rahmatollah Fakhri; and York, Ira Bill Lee, to Textron, Inc. Method of forming a rivet of titanium-columbium alloy. 3,975,786, Cl. 10-27.00E.

Garcia Corporation: *See—*
Juzenko, Maurice J., 3,975,840.

Gardner, William J.: *See—*
Lacher, Thomas F., Jr.; Grob, Russel W.; and Gardner, William J., 3,975,952.

Garrigus, Walter E.; and Glick, Murry I., to Aeronutronic Ford Corporation. High efficiency broad band traveling-wave amplifier harmonic conditioning. 3,976,953, Cl. 330-43.000.

Garrison, Marion A., to Empire Oil Tool Company. Fluid driven motor having improved blade construction. 3,976,408, Cl. 418-153.000.

Gaspari, Russell A. Planar balun. 3,976,959, Cl. 333-26.000.

Gasser, Rupert J.; and Franklin, James G., to Societe d'Assistance Technique pour Produits Nestle S.A. Powdered tea product and process for production. 3,976,804, Cl. 426-597.000.

Gaughan, Edmund: *See—*
Arneklev, Duane R.; Pallos, Ferenc M.; and Gaughan, Edmund, 3,976,469.

Gaulding, Dan L.: *See—*
Scott, Robert H.; and Gaulding, Dan L., 3,976,595.

Gautschi, Fritz: *See—*
Winter, Max; Gautschi, Fritz; Flament, Ivon; Stoll, Max; and Goldman, Irving M., 3,976,802.

Gea Luftkuhlergesellschaft Happel GmbH & Co. KG: *See—*
Ruff, Klemens, 3,976,126.

Gehman, Earl: *See—*
Moore, Thomas A.; Gehman, Earl; and Huddleston, George, 3,976,999.

Geier, Joseph: *See—*
Bernardi, Herbert; Lehle, Erhard; Geier, Joseph; Von Aschwege, Gerd; and Haberstroh, Markus, 3,976,291.

Geiger, Kenneth Daniel; Horvath, Steven Joseph; Niessen, Paul; and Seymour, Theodore Joseph, to Cominco Ltd. Pump. 3,976,405, Cl. 418-102.000.

Geisel, Herbert: *See—*
Reinke, Friedhelm; Voss, Hermann; and Geisel, Herbert, 3,976,520.

Geissler, Edward C.: *See—*
Peck, David B.; and Geissler, Edward C., 3,976,922.

Gekhardt, Charles F.: *See—*
Grawey, Charles E.; Untz, Robert W.; Koch, Keith E.; and Gekhardt, Charles F., 3,976,116.

Gelfandbein, Yakov Aronovich: *See—*
Alien, Imant Karlovich; Avdeev, Ivan Ivanovich; Gelfandbein, Yakov Aronovich; Ershov, Boris Nikolaevich; Nikonenko, Anatoly Vasilievich; Popov, Jury Olegovich; Khesin, Arkady Yakovlevich; and Yanson, Boris Albertovich, 3,976,827.

General Atomic Company: *See—*
Fortescue, Peter, 3,976,542.

General Electric Company: *See—*
Baldwin, Frederick M.; and Noesen, Stanley J., 3,975,936.
Blackmer, Richard H.; and Hedman, Jonathan W., 3,976,451.
Chang, David R., 3,976,436.
Collins, James R., 3,976,932.
DeTommasi, Arthur N., 3,976,811.
Edwards, Clarence Roy; and Nolan, John James, 3,976,861.
Farrington, Gregory C.; and Roth, Walter L., 3,976,504.
Farrington, Gregory C.; and Roth, Walter L., 3,976,505.
Kenyon, Lewis W.; and Grindle, James L., 3,976,349.
Kreng, Jack K.; and Ghaem-maghami, Sanjar, 3,976,944.
Lane, Lawrence J., 3,976,868.
Lee, Gim F., Jr., 3,976,725.
McCauley, Michael J.; and Shaner, Richard L., 3,975,920.
Milkovic, Miran, 3,976,941.
Owens, Michael; and Knoble, David W., 3,976,910.
Powers, Robert W.; Mitoff, Stephan P.; and Szymalak, Edward, 3,976,554.

General Foods Corporation: *See—*
Olson, Robert D.; and Eifler, Robert H., 3,976,793.

General Signal Corporation: *See—*
Murray, John R.; Heer, Harvey W.; and Carswell, Larry G., 3,976,272.
Smith, William E.; and Bowden, Charles J., 3,975,908.

General Staple Company, Inc.: *See—*
Meyer, H. T., 3,975,811.

General Tire & Rubber Company, The: *See—*
PerDue, James E., 3,976,252.

George, Thomas: *See—*
Nagarajan, Kuppuswamy; Arya, Vishwa Prakash; and George, Thomas, 3,976,778.

Gerlach, Charles R., to Rineer Hydraulics, Inc. Fluid power converter side seal. 3,976,407, Cl. 418-142.000.

Gerlach, Hans W., to Summit Metal Fabricating, Inc. Can and bottle crusher. 3,976,002, Cl. 100-215.000.

Gerstenmeier, Jurgen; Korasiak, Wolfgang; Morath, Thomas; and Muller, Hans, to Teldix GmbH. Method and arrangement for conversion of a digital measured value. 3,976,860, Cl. 235-151.300.

Gerster, John F.; and Leir, Charles M., to Riker Laboratories, Inc. 7-Hydroxy-benzo[ij]quinolizine-2-carboxylic acids, intermediates, and a method for their production. 3,976,651, Cl. 260-287.00P.

Gesellschaft fur Kernforschung m.b.H: *See—*
Wedemeyer, Horst, 3,976,749.

GF Business Equipment, Inc.: *See—*
Breckner, Gerald; Donahue, Charles R.; Hage, C. Herbert; and Williams, Philip J., 3,976,343.

Ghaem-maghami, Sanjar: *See—*
Kreng, Jack K.; and Ghaem-maghami, Sanjar, 3,976,944.

Ghionda, Andre. Dwelling with plural levels and stored furniture. 3,975,871, Cl. 52-36.000.

Giaume, Antoine S. B. Portable display device. 3,975,850, Cl. 40-125.00H.

Gildone, Anthony M.: *See—*
Martin, Richard E.; and Gildone, Anthony M., 3,976,221.

Gingrich, Reynard W.: *See—*
Houston, James E.; Gingrich, Reynard W.; and Schilt, Earl A., 3,976,430.

Ginsberg, Guenter, to Coulter Electronics, Inc. Backwash system for diluting apparatus. 3,976,429, Cl. 23-259.000.

Giordano, Salvatore T.: *See—*
Aggus, John R.; Giordano, Salvatore T.; and Halama, Henry J., 3,976,950.

Giovanelli, Anton Alfred Arthur; and Schmidt, Eckhard Wolfgang, to Imperial Chemical Industries Limited. Process for the production of pile surfaced articles. 3,976,820, Cl. 428-85.000.

Girling Limited: *See—*
Farr, Glyn Phillip Reginald, 3,976,334.

Giulie, Joe D.; and Worcester, Leslie E., to Minnesota Mining and Manufacturing Company. Paper sawing machine. 3,975,975, Cl. 83-410.000.

GKN Birwelco Limited: *See—*
Harris, Peter John, 3,976,127.

GKN Forgings Limited: *See—*
Dawson, Ronald John, 3,976,204.

Glaenzer Spicer: *See—*
Orain, Michel, 3,975,922.

Glasser, Herman; and Panetta, Patrick F., to Nuclear Associates, Inc. Device for adsorbing exhaled radioactive gases and process. 3,976,050, Cl. 128-2.00A.

Glaxo Laboratories Limited: *See—*
Clark, John Colin; and Elks, Joseph, 3,976,680.
Smith, Alan; and Larner, Ronald W., 3,976,546.

Glenn, William E., to CBS Inc. Apparatus and method for embossing information on a disc. 3,976,830, Cl. 178-6.60B.

Glick, Murry I.: *See—*
Garrigus, Walter E.; and Glick, Murry I., 3,976,953.

Glowacki, John J. Grinding system. 3,975,864, Cl. 51-165.870.

GMF Inc.: *See—*
Martin, Richard E.; and Gildone, Anthony M., 3,976,221.

Gobran, Ramsis, to Minnesota Mining and Manufacturing Company. Adhesives tackified with low molecular weight terpene-phenolic resins. 3,976,606, Cl. 260-4.0AR.

Godfrey, William H., to Caterpillar Tractor Co. Cab mounting structure. 3,976,323, Cl. 296-102.000.

Goel, Narendra S.; and Fletcher, Gerald M., to Xerox Corporation. Belt transfer and fusing system. 3,976,370, Cl. 355-3.00R.

Goffe, William L., to Xerox Corporation. Erasing process. 3,976,483, Cl. 96-1.0PS.

Goggi, Charles P., to Goggi Corporation. Apparatus and method for mixing and dispersing engine drainage into the fuel flow to an engine. 3,976,040, Cl. 123-73.0AD.

Goggi Corporation: *See—*
Goggi, Charles P., 3,976,040.

Golborn, Peter; and Duffy, James J., to Hooker Chemicals & Plastics Corporation. Phosphorus containing amides flame retardants. 3,976,620, Cl. 260-45.9NC.

Goldman, Irving M.: *See—*
Winter, Max; Gautschi, Fritz; Flament, Ivon; Stoll, Max; and Goldman, Irving M., 3,976,802.

Gomes, John M.; and O'Keefe, Daniel A., to United States of America, Interior. Preparation of TiO_2 and artificial rutile from sodium titanate. 3,976,761, Cl. 423-610.000.

Gondra Industries & Co.: *See—*
Katayama, Morio, 3,975,803.

Goodell, John Boyden: *See—*
Lindemann, Harley Burke; and Goodell, John Boyden, 3,976,364.

Goransson, Rolf Erik, to Internationella Siporex Aktiebolaget. Suction device for grasping and handling a generally parallelepipedic body. 3,976,205, Cl. 214-1.0QD.

Gordon, Gary B.; Haag, George A.; Hofland, Jan R.; and Kolody, Daniel I., to Hewlett-Packard Company. Apparatus and method for testing digital circuits. 3,976,864, Cl. 235-153.0AC.

Goss, Lorane C., Jr., to Capitol Products Corporation. Decorative exterior trim system for windows. 3,975,875, Cl. 52-211.000.

Gottfried Bischoff Bau kompl. Gasreinigungsund Wasserruckkuhlanlagen Kommandigesellschaft: *See—*
Hausberg, Gerhard; and Hegemann, Karl-Rudolf, 3,976,454.

GR-Stein Refractories Limited: *See—*
Thompson, Peter; and Taylor, John Richardson, 3,976,286.

Graham, Charles H., to Hankison, Paul M. Tube coupler. 3,976,314, Cl. 285-238.000.

Graham, Robert R. Automatic fishing machine. 3,975,854, Cl. 43-6.500.

Granholm, Sven; and Meijer, Borje, to Linden-Alimak AB. Rock drill equipment having a mechanized drill bit exchange. 3,976,149, Cl. 175-52.000.

Granquist, William T., to NL Industries, Inc. Laminar heavy metal aluminosilicates. 3,976,744, Cl. 423-118.000.

Grant, Louis R., to Rockwell International Corporation. Method of synthesizing triazanium perchlorate monohydrate. 3,976,753, Cl. 423-351.000.

Grant, Norman H.: *See—*
Alburn, Harvey E.; and Grant, Norman H., 3,976,692.

Grantham & Oleson, Inc.: *See—*
Irik, Harry, 3,976,260.

Grass, Alfred. Guide rails for drawers. 3,976,346, Cl. 312-350.000.

Grassme, Ulrich: *See—*
Noske, Erich; and Grassme, Ulrich, 3,976,889.

Grawey, Charles E.; Untz, Robert W.; Koch, Keith E.; and Gekhardt, Charles F., to Caterpillar Tractor Co. Rim constructions. 3,976,116, Cl. 152-405.000.

Gray, Derek Cory: *See—*
Jack, James; and Gray, Derek Cory, 3,976,410.

Greene, Clarence Kirk. Geothermal dual energy transfer method and apparatus. 3,975,912, Cl. 60-641.000.

Greenfield, William D.: *See—*
Blenkarn, Kenneth A.; and Greenfield, William D., 3,976,021.

Greenwald, Richard B., to Polaroid Corporation. N-(lower alkyl sulfonyl-methyl sulfonyl)-piperazines. 3,976,647, Cl. 260-268.00S.

Greenwood, James E.: *See—*
Wood, William W.; Greenwood, James E.; and Clements, Walter M., 3,976,064.

Greer Hydraulics, Inc.: *See—*
Baump, Paul A.; and Marinaccio, Mario, 3,975,861.

Gregory, Earl: *See—*
Lowe, James N.; and Gregory, Earl, 3,976,741.

Gribnitz, Harry J.: *See—*
Buix, Louis F.; Gribnitz, Harry J.; and Hohner, Gary A., 3,976,208.

Grimes, Eldon L.; and Bullock, Kenneth W., to Marine Construction & Design Co. Shrimp processing apparatus. 3,975,797, Cl. 17-73.000.

Grimpe, Karl, to Demag Aktiengesellschaft. Overload control coupling between two rotating machine elements. 3,975,923, Cl. 64-28.00R.

Grinberg, Jan: *See—*
Seidman, Ady; Avrahami, Zohar; Sheinfux, Benjamin; and Grinberg, Jan, 3,976,905.

Grindle, James L.: *See—*
Kenyon, Lewis W.; and Grindle, James L., 3,976,349.

Grob, Russel W.: *See—*
Lacher, Thomas F., Jr.; Grob, Russel W.; and Gardner, William J., 3,975,952.

Grolman, Bernard: *See—*
Richards, William; and Grolman, Bernard, 3,975,779.

Groner, Carl F., to Eastman Kodak Company. Photoimmobilized electrophoretic recording process. 3,976,485, Cl. 96-1.200.

Grozinger, Dieter, to Robert Bosch G.m.b.H. Variable-speed drill. 3,975,966, Cl. 74-329.000.

Gruber, Wilhelm; Schnierle, Franz; and Schroeder, Guenter, to Rohm GmbH. Method for making cyanogen chloride. 3,976,754, Cl. 423-383.000.

Grumblatt, Victor J., to Lord Corporation. Hinge. 3,976,326, Cl. 297-333.000.

GRW & Associates, Inc.: *See—*
de Kanter, Hendrik, 3,976,220.

GTE Automatic Electric (Canada) Limited: *See—*
Shaver, David M., 3,976,952.

GTE Sylvania Incorporated: *See—*
Ashley, Albert H., 3,976,845.
Wheeler, Robert Charles, 3,976,836.

Gulf & Western Industries, Inc.: *See—*
Madeira, John W.; and Merklen, Kenneth E., 3,976,044.

Gullichsen, Johan E.; and Ekholm, Rolf G., to Kamyr Aktiebolag. Method for bleaching of cellulosic pulp. 3,976,538, Cl. 162-17.000.

Gunther, Roland Eric. Mower blades. 3,975,891, Cl. 56-295.000.

Gupta, Gautam Sen, to Boeing Company, The. Intrinsically tuned structural panel. 3,976,269, Cl. 244-119.000.

Guyot, Volker; Holdinghausen, Paul; and Mueller, Martin, to Carl Schenck AG. Method and circuit arrangement for producing electrical reference pulses. 3,976,947, Cl. 328-108.000.

Haag, George A.: *See—*
Gordon, Gary B.; Haag, George A.; Hofland, Jan R.; and Kolody, Daniel I., 3,976,864.

Haak, Gary R., to Teletype Corporation. Apparatus and method for offsetting selected characters of a character display. 3,976,990, Cl. 340-324.0AD.

Haase, Charles A. In-drum drive and speed reducer. 3,975,973, Cl. 74-805.000.

Haase, Herman: *See—*
Marcote, Roland; Eisenberg, Steve; Chand, Ramesh; and Haase, Herman, 3,976,450.

Haber, Terry M. Multi-function watch casing. 3,975,899, Cl. 58-88.00R.

Haberstroh, Markus: *See—*
Bernardi, Herbert; Lehle, Erhard; Geier, Joseph; Von Aschwege, Gerd; and Haberstroh, Markus, 3,976,291.

Haffer, Gregor: *See—*
Eder, Ulrich; Haffer, Gregor; Ruppert, Jurgen; Sauer, Gerhard; and Wiechert, Rudolf, 3,976,701.

Hafle, Ralph S., to United States of America, National Aeronautics and Space Administration. Digital plus analog output encoder. 3,976,997, Cl. 340-347.0SY.

Hage, C. Herbert: *See—*
Breckner, Gerald; Donahue, Charles R.; Hage, C. Herbert; and Williams, Philip J., 3,976,343.

Hager, Robert Bonner, to Pennwalt Corporation. Fluorine and sulfur-containing compositions. 3,976,698, Cl. 260-584.00R.

Haines, Paul Gordon: *See—*
Popoff, Ivan Christoff; and Haines, Paul Gordon, 3,976,648.

Hajdu, Juan: *See—*
Fadgen, Earl J., Jr.; and Hajdu, Juan, 3,976,816.

Halama, Henry J.: *See—*
Aggus, John R.; Giordano, Salvatore T.; and Halama, Henry J., 3,976,950.

Halasa, Adel F.; and Tate, David P., to Firestone Tire & Rubber Company, The. Process for polylithiating unsaturated polymers. 3,976,628, Cl. 526-22.000.

Hall, Albert Moore: *See—*
Monter, Robert Paul; Hall, Albert Moore; and Cartmell, James Vernon, 3,976,055.

Hall, Floyd Vameda, to Liggett & Myers, Incorporated. Automatic cigarette feed machine. 3,976,085, Cl. 131-25.000.

Hall, Gordon Dennis: *See—*
Acton, Lawrence Lee; Bartle, Ervin Roy, Jr.; and Hall, Gordon Dennis, 3,976,884.

Hall, John B.; Tseng, Ching Y.; Vock, Manfred Hugo; Vinals, Joaquin; and Shuster, Edward J., to International Flavors & Fragrances Inc. Flavoring compositions containing alkyl esters of 2-methyl-4-pentenoic acid. 3,976,801, Cl. 426-534.000.

Hall, Robert N. Method and apparatus for pyrolyzing oil shale. 3,976,558, Cl. 208-11.00R.

Halliburton Company: *See—*
Anderson, Buddy W., 3,976,135.
Farley, David L.; and Evans, Robert T., 3,976,136.

Hallinger, Claude Christian; and Kerviatin, Robert, to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation. Device for regulating turbine blade tip clearance. 3,975,901, Cl. 60-39.140.

Hamada, Osamu, to Sony Corporation. Protective circuit for pulse width modulated signal amplifier. 3,976,955, Cl. 330-207.00P.

Hammarstrand, Sten Ove. Pivoting axle system for terrain vehicles. 3,976,302, Cl. 280-6.00H.

Hammer, Clarence Frederick; and Starkweather, Howard Warner, Jr., to Du Pont de Nemours, E. I., and Company. Polyamide/polyolefin plastic graft copolymers. 3,976,720, Cl. 260-857.00G.

Hammond, Peter R., to United States of America, Navy. Method of making 2,6-bis(methylamino) or 2,6-bis(dimethylamino)pyridines. 3,976,655, Cl. 260-296.00R.

Hammond, Peter R., to United States of America, Navy. 1,4-Bis(5-p-n-butoxyphenyloxazol-2-yl)benzene and the preparaion thereof. 3,976,656, Cl. 260-307.00R.

Hamner, Glen Porter: *See—*
Bearden, Roby, Jr.; and Hamner, Glen Porter, 3,976,559.

Haneji, Yasuo; and Kinjo, Hisao, to Victor Company of Japan, Limited. Recording and/or reproducing apparatus employing a rotating recording medium. 3,977,024, Cl. 360-78.000.

Hankison, Paul M.: *See—*
Graham, Charles H., 3,976,314.

Hansen, Kenneth R.: *See—*
Ekama, Peter J.; Hansen, Kenneth R.; and Barnett, Charles B., 3,976,264.

Harada, Masachika: *See—*
Kobayashi, Yoshikazu; and Harada, Masachika, 3,977,021.

Harada, Takeo: *See—*
Fujino, Nobukatsu; Yamanaka, Kazuo; and Harada, Takeo, 3,976,513.

Harbauer, Werner, to Siemens Aktiengesellschaft. Terminal for electric conductors. 3,976,353, Cl. 339-274.000.

Hardt, Udo: *See—*
Rahlfs, Herbert; and Hardt, Udo, 3,976,411.

Harned, Harold; Hilliard, William G.; and Williams, Clayton G., to Zarn, Inc. Planter and reservoir. 3,975,860, Cl. 47-38.100.

Harper, Roland George, Jr., to Lamb Industries, Inc. Tubing spreader mechanism. 3,976,132, Cl. 166-85.000.

Harrington, Charles L., to Wigma Corporation. Sprinkler head shut-off mechanism. 3,976,141, Cl. 169-90.000.

Harris, Peter John, to GKN Birwelco Limited. Heat exchanger assemblies. 3,976,127, Cl. 165-125.000.

Harris, Wilbur E., to Uniroyal Inc. Apparatus for producing continuous strip of uncured rubber and like raw materials. 3,975,974, Cl. 83-1.000.

Harrison, Charles W.; and Senters, Glenn A., to Texaco Inc. Controlling the temperature of a depropanizer tower by chromatographic analysis of feed and bottoms. 3,976,179, Cl. 196-132.000.

Harrison, Harry W. Pipeline positioning system. 3,975,919, Cl. 61-108.000.

Harrison, Ronald Arthur, to Plessey Handel und Investments A.G. Gas ignition devices. 3,976,900, Cl. 310-8.700.

Harrowing, Sidney Stewart. Restoration of suction press shells. 3,975,814, Cl. 29-401.00F.

Hartke, Francis J.; and Davis, James E., to Petrolite Corporation. Amine bisulfites. 3,976,593, Cl. 252-391.000.

Hartmann, Eduard: *See—*
Hauser, Hans Ulrich; and Hartmann, Eduard, 3,976,415.

Harvey, Benjamin F. Variable volume liquid pumping system. 3,975,910, Cl. 60-487.000.

Harvey, Wilfred G., Sr.: *See—*
Klimboff, Morris; and Harvey, Wilfred G., Sr., 3,975,781.

Hashimoto, Yoshio: *See—*
Matsukura, Kameo; Watanabe, Kunio; Hashimoto, Yoshio; Nakayama, Masatoki; Nakasugi, Hajime; and Takeda, Tetuo, 3,976,514.

Haslau, Horst Eugen; and Mattson, Glenn Arvid, to RCA Corporation. Automatic coil winding machine and method. 3,976,256, Cl. 242-4.00B.

Hattori, Tadashi: *See—*
Kohama, Tokio; Obayashi, Hideki; Hattori, Tadashi; and Nishida, Minoru, 3,975,951.

Hauk, Thomas D.; and Carstensen, Kenneth J., to Service Equipment Design Co., Inc. Apparatus for testing pipe for leaks. 3,975,945, Cl. 73-46.000.

Haun, Marion W., to American Magnetics Corporation. Card reader assembly with manual transducer. 3,976,858, Cl. 235-61.11D.

Haupt, Eberhard: *See—*
Altmann, Horst Dieter; and Haupt, Eberhard, 3,976,855.

Hauri, Rene; and Misslin, Raphael Charles, to Ciba-Geigy AG. Evaporator-block container with adjustable cross section of outlet aperture. 3,976,246, Cl. 239-57.000.

Hausberg, Gerhard; and Hegemann, Karl-Rudolf, to Gottfried Bischoff Bau kompl. Gasreinigungsund Wasserruckkuhlanlagen Kommandigesellschaft. Exhaust system for steel-making plant. 3,976,454, Cl. 55-226.000.

Hauser, Anthony J.: *See—*
Berry, James M.; Hauser, Anthony J.; Knuth, Kurt E.; and Ollendick, Gary B., 3,977,007.

Hauser, Hans Ulrich; and Hartmann, Eduard, to Bucher-Guyer AG Maschinenfabrik. Injection moulding control. 3,976,415, Cl. 425-145.000.

Havens, Carl B., to Dow Chemical Company, The. Method for the preparation of plastic articles by extrusion and cooling by gas bearing. 3,976,733, Cl. 264-89.000.

Haw, Sherwood Gordon, to Firestone Tire & Rubber Company, The. Anchor assembly for an inflatable fabric dam. 3,975,915, Cl. 61-30.000.

Hawthorne, Marion F.; and Paxson, Timm E., to United States of America, Navy. Hydridometallic carborane catalytic compounds. 3,976,596, Cl. 252-431.00P.

Hawthorne, Peter Frederick, to Foseco International Limited. Refractory heat insulating materials. 3,976,728, Cl. 264-26.000.

Hayakawa, Kiyoshi: *See—*
Satake, Kunio; Yamada, Tsuyoshi; Sakamoto, Kuniaki; Hayakawa, Kiyoshi; and Fukawa, Isaburo, 3,976,721.

Hayashibara Biochemical Laboratories, Incorporated: *See—*
Matsunaga, Hiroomi; Tsuji, Kozo; and Saito, Teruo, 3,976,605.
Mori, Atsuo; Tsuji, Kozo; and Kitamura, Shuji, 3,976,819.

Hayashida, Motoyuki: *See—*
Muroki, Takumi; and Hayashida, Motoyuki, 3,976,036.

Hayward, Malcolm Edwin; and Maier, Volker Elmar, to ICI Australia Limited; and Commonwealth Scientific and Industrial Research Organization. Process of manufacturing spherical polymeric beads. 3,976,629, Cl. 526-227.000.

Hayward Research, Inc.: *See—*
Hoyt, Clifton A., 3,976,842.

Heald, Jesse H., Jr., to Lannom Manufacturing Company, Inc. Game ball. 3,976,295, Cl. 273-60.00R.

Hearn, Daniel P., to Atlantic Richfield Company. Method and apparatus for recording position of sensor in airborne magnetic surveying. 3,976,937, Cl. 324-4.000.

Heath, Jon M.: *See—*
Csathy, Denis G.; Hung, Wendell L. Y.; and Heath, Jon M., 3,976,033.

Hecht, James Lee, to Du Pont de Nemours, E. I., and Company. Process for anion removal from orthophosphate coatings. 3,976,810, Cl. 427-40.000.

Heckman, Paul J., Jr.: *See—*
McCardell, Peter D.; and Heckman, Paul J., Jr., 3,976,369.

Hedman, Jonathan W.: *See—*
Blackmer, Richard H.; and Hedman, Jonathan W., 3,976,451.

Heer, Harvey W.: *See—*
Murray, John R.; Heer, Harvey W.; and Carswell, Larry G., 3,976,272.

Hegemann, Karl-Rudolf: *See—*
Hausberg, Gerhard; and Hegemann, Karl-Rudolf, 3,976,454.

Hegler, Ralph-Peter: *See—*
Hegler, Wilhelm; and Hegler, Ralph-Peter, 3,976,414.

Hegler, Wilhelm; and Hegler, Ralph-Peter. Apparatus for the production of double-walled synthetic plastic tubes having a transversely corrugated outer wall and a smooth inner wall. 3,976,414, Cl. 425-131.100.

Hegner, Gerhard, to Friedrich Unde GmbH. Can or drum changing device for fiber spinning plants. 3,976,203, Cl. 214-1.0BC.

Hehl, Karl. Adjustable die closing unit for injection molding machine. 3,976,416, Cl. 425-242.00R.

Heidebroek, Reinhard H. H., to Claudius Peters AG. Device for emptying silos for bulk material, provided with a flat or slightly inclined bottom. 3,976,232, Cl. 222-193.000.

Heidelberger Druckmaschinen Aktiengesellschaft: *See—*
Junghans, Rudi; and Czotscher, Ernst, 3,976,007.

Heinke, Gunter: *See—*
Leyendecker, Ralf; and Heinke, Gunter, 3,976,342.

Heiser, Richard S.: *See—*
Smith, Jack R.; Burrows, Leonard H.; Heiser, Richard S.; Hertz, Richard J.; Pesavento, Joseph A.; Reuther, John F.; Shields, James J.; and Yannone, Robert A., 3,975,902.

Hellkuhl, Ludger, to Maschinenfabrik Fahr Aktiengesellschaft. Rotary rake for haying machine usable for tedding and windrowing. 3,975,892, Cl. 56-365.000.

Hemfort, Heinrich, to Westfalia Separator Aktiengesellschaft. Self-emptying clarifying separator having a foam-free removal of the clarified liquid by means of a paring disk and an automatically operating system for detecting the level of the solids in the sludge chamber. 3,976,242, Cl. 233-20.00R.

Henault, Claude, to Regie Nationale des Usines Renault; and Societe dite: Automobiles Peugeot. Internal combustion engine with stratified charge. 3,976,039, Cl. 123-32.0ST.

Hench, Hans, Sr.; Hunke, Friedrich; and Wolber, Claus, to Automatik Apparate-Maschinenbau Hans Hench GmbH. Machine for granulating strands of material. 3,976,254, Cl. 241-222.000.

Hendrix, Warren P.: *See—*
Ball, Dean M.; Camp, Ronnie W.; Hendrix, Warren P.; and Orr, Clyde, Jr., 3,975,946.

Hennart, Claude, to Airwick Industries, Inc. Pesticidal compositions containing phosphoric esters and divalent sulphur compounds. 3,976,769, Cl. 424-175.000.

Henneman, John W.; and Hinds, Duane E., to Bendix Corporation, The. Escape breathing apparatus. 3,976,063, Cl. 128-142.700.

Henny Penny Corporation: *See—*
Stoermer, William F., 3,976,218.

Hepworth, Edward C.; and Means, Rodney J., to Motorola, Inc. Edge sensitive set-reset flip flop. 3,976,949, Cl. 328-206.000.

Herber, John F.; Street, Robert W.; and Richard, William R., Jr., to Monsanto Company. Functional fluid compositions containing epoxide stabilizers. 3,976,585, Cl. 252-78.500.

Herbert, William B. Self-energizing clutch. 3,976,175, Cl. 192-44.000.

Herger, Zoltan L.: *See—*
Derby, Howard L.; Epina, August P.; Olmsted, Dennis R.; Platter, Sanford; and Herger, Zoltan L., 3,975,789.

Hermes Precisa International S.A.: *See—*
Aebi, Otto, 3,976,185.

Heron, William D.: *See—*
Barclay, Doltie W., 3,976,057.

Herrera, Frank J.; and Ponce, Rodger G., to Casa Herrera, Inc. Distributing and processing apparatus. 3,976,188, Cl. 198-31.0AA.

Herrington, F. John, to Mobil Oil Corporation. Method for the extrusion of tubular thermoplastic film. 3,976,732, Cl. 264-89.000.

Herrmann, Heinz; and Brechlin, Alfred, to Hoechst Aktiengesellschaft. Electrophotographic developer liquid. 3,976,583, Cl. 252-62.10L.

Hertz, Richard J.: *See—*
Smith, Jack R.; Burrows, Leonard H.; Heiser, Richard S.; Hertz, Richard J.; Pesavento, Joseph A.; Reuther, John F.; Shields, James J.; and Yannone, Robert A., 3,975,902.

Hertz, Theodore M., to Rockwell International Corporation. Data reordering system. 3,976,980, Cl. 340-172.500.

Heseltine, Donald W.: *See—*
Brooker, Leslie G. S.; Fumia, Arthur, Jr.; and Heseltine, Donald W., 3,976,661.

Hesterman, Victor W., to Superconducting Technology, Inc. Superconducting magnetic sensor with improved balancing system. 3,976,938, Cl. 324-43.00R.

Hettich, Anton; Stellbrink, Udo; and Sundermeier, Gunter, to Kunststoff GmbH. Door closing device. 3,975,791, Cl. 16-72.000.

Hewlett-Packard Company: *See—*
Cox, Roger G., 3,976,945.
Egbert, William E., 3,976,926.
Gordon, Gary B.; Haag, George A.; Hofland, Jan R.; and Kolody, Daniel I., 3,976,864.

Hewlett-Packard GmbH: *See—*
Junginger, Gerhard; and Zeeb, Helmut, 3,976,052.

Hickin, Charles Wyndham Robinson; and Smith, David Allen. Brightness control and compensation circuitry for cathode ray tube displays. 3,976,991, Cl. 340-324.00A.

Hicklin, Denis Raymond: *See—*
Attwood, Brian William; and Hicklin, Denis Raymond, 3,976,412.

Hickman, Robert George, to Rank Xerox Ltd. Elimination of redundant image. 3,976,374, Cl. 355-14.000.

Hidaka, Hideo: *See—*
Katoh, Takashi; Hidaka, Hideo; and Oda, Singo, 3,975,798.

High Pressure Equipment Co. Inc.: *See—*
Walker, Robert D., 3,976,279.

Hildebrandt, Jurgen J.; Zahn, Paul; Witt, Alfred Nikolaus; and Jager, Michael, to Messerschmitt-Bolkow-Blohm GmbH. Extension apparatus, especially for osteotomic surgery. 3,976,060, Cl. 128-84.00R.

Hill, Barry Michael Ernest: *See—*
Larner, Douglas Stanley; Thillainayagam, Velauthar Kopalapillai; Blackmore, Ronald William; and Hill, Barry Michael Ernest, 3,976,835.

Hill, David T.: *See—*
Berkoff, Charles E.; Hill, David T.; and Loev, Bernard, 3,976,633.

Hill, Rosolde: *See—*
Wunder, Wolf; Kohne, Volker; Hill, Rosolde; and Leogrande, Antonio, 3,976,474.

Hiller, Trueman W.: *See—*
Woodford, John D.; and Hiller, Trueman W., 3,976,131.

Hilliard, William G.: *See—*
Harned, Harold; Hilliard, William G.; and Williams, Clayton G., 3,975,860.

Hilton, Howard Thorndike: *See—*
Erickson, Byron Ted; and Hilton, Howard Thorndike, 3,977,010.

Hinata, Masanao; Takei, Haruo; Sato, Akira; and Ikeda, Tadashi, to Fuji Photo Film Co., Ltd. Silver halide photographic emulsions. 3,976,492, Cl. 96-100.000.

Hinchman, LeRay V. Dart. 3,976,298, Cl. 273-106.50R.

Hinds, Duane E.: *See—*
Henneman, John W.; and Hinds, Duane E., 3,976,063.

Hinohara, Kango; Nishikawa, Makoto; Yokomoto, Noriaki; and Matsumura, Kenichi, to Kabushiki Kaisha Kumahira Seisakusho. Card-controlled lock installations including matrix circuits. 3,976,974, Cl. 340-149.00A.

Hirai, Akiyoshi; Yamamoto, Masachika; and Kimura, Ryoichi, to Sumitomo Electric Industries, Ltd.; and Toyota Jidosha Kogyo Kabushiki Kaisha. Brake pad with wear indicator. 3,976,167, Cl. 188-1.00A.

Hirasawa, Masataka, to Tokyo Shibaura Electric Co., Ltd. Level shifting circuit device. 3,976,984, Cl. 340-173.00R.

Hirmann, Georg, to Homberger, Rudolf Felix. Pressure responsive force transmission apparatus. 3,975,989, Cl. 92-48.000.

Hirose, Tadatsugu; Urade, Toshinori; and Yamaguchi, Hisashi, to Fujitsu Ltd. Gas discharge panel self shift drive system and method of driving. 3,976,993, Cl. 340-324.00M.

Hirsch, Clarence A.: *See—*
Fields, Calvin H.; and Hirsch, Clarence A., 3,976,674.

Hitachi, Ltd.: *See—*
Kaji, Tadao; and Katsube, Takeki, 3,975,818.
Kawakami, Hideaki, 3,976,362.
Nakajima, Fumito; Tekeuchi, Masato; Matsuda, Shimpei; Uno, Shigeo; Mori, Toshikatsu; Watanabe, Yoshihisa; and Imanari, Makoto, 3,976,745.
Shimo, Shoji; and Atago, Takeshi, 3,975,905.

Hitachi Metals, Ltd.: *See—*
Watanabe, Rikizo, 3,976,480.

Hitco: *See—*
Wizon, Irvin, 3,976,746.

Hoch, Rene Gerard; and Julliand, Michel Henri, to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation. Device for the attenuation of noise emission by the jet pipes of jet engines. 3,976,160, Cl. 181-33.0HD.

Hodek, Jiri G.: *See—*
Spurling, John E.; Hodek, Jiri G.; and Kessels, Edward J., 3,975,805.

Hodge, Donald William: *See—*
Tilby, Sydney Edward; Mason, William C. W.; and Hodge, Donald William, 3,976,498.

Hodges, Jimmie Ray: *See—*
Merchant, Dhirendra Ranchhoddas; and Hodges, Jimmie Ray, 3,976,447.

Hodgson, Robert J.; and Clark, Henry, to Pacific Electricord Company. Supporting and displaying apparatus for merchandise items. 3,976,201, Cl. 211-59.000.

Hoechst Aktiengesellschaft: *See—*
Herrmann, Heinz; and Brechlin, Alfred, 3,976,583.

Hofer, Kurt: *See—*
Avar, Lajos; Hofer, Kurt; and Preiswerk, Martin, 3,976,658.

Hoffman, Joseph Adrian, to American Cyanamid Company. Carboxyalkyl and carbamoylalkyl substituted poly(phosphine oxide) flame-retardants. 3,976,685, Cl. 260-515.00M.

Hoffmann, Gunthard; and Striebeck, Achim, to Chemische Werke Huls Aktiengesellschaft. Removal of deactivating dust particles from fixed bed catalysts in the vapor phase oxidation of naphthalene to phthalic anhydride. 3,976,666, Cl. 260-346.400.

Hoffmann-La Roche Inc.: *See—*
Batcho, Andrew David; and Leimgruber, Willy, 3,976,639.
Spector, Sidney, 3,976,763.

Hofland, Jan R.: *See—*
Gordon, Gary B.; Haag, George A.; Hofland, Jan R.; and Kolody, Daniel I., 3,976,864.

Hogberg, Knut Goran; and Meurling, Olof Wilhelm, to AB ID-Kort. Method and an arrangement for reading coded information from a data carrier. 3,976,857, Cl. 235-61.11E.

Hohner, Gary A.: *See—*
Buix, Louis F.; Gribnitz, Harry J.; and Hohner, Gary A., 3,976,208.

Hojnowski, Edward J. Rotary engine. 3,976,037, Cl. 123-8.250.

Hokama, Takeo; and Scardiglia, Frank, to Velsicol Chemical Corporation. Copolymers and preparational method therefor. 3,976,607, Cl. 260-4.0AR.

Holder, Gradie R. Combination digger and sifter for use with metal detector. 3,976,564, Cl. 209-38.000.

Holdinghausen, Paul: *See—*
Guyot, Volker; Holdinghausen, Paul; and Mueller, Martin, 3,976,947.

Holladay, John H.; and Shackelford, Albert D., to United States of America, Agriculture. Chicken coop lifting device. 3,976,320, Cl. 294-67.00R.

Hollandsche Beton Groep N.V.: *See—*
Jansz, Joost Werner, 3,975,918.

Hollymatic Corporation: *See—*
Theis, James V., Jr., 3,976,389.

Holmer, Bo Gunnar: *See—*
Danell, Curt; Holmer, Bo Gunnar; and Rodhe, Peder Magnus, 3,976,831.

Holmes, Timothy L.; and Thompson, Sheldon L., to Sun Oil Company of Pennsylvania. Isoparaffin-olefin alkylation utilizing recycle streams and multiple packed catalyst beds. 3,976,713, Cl. 260-683.450.

Holzermer, Gunter; and Schmitt, Gunter, to Siemens Aktiengesellschaft. X-ray examination apparatus. 3,976,887, Cl. 250-468.000.

Homberger, Rudolf Felix: *See—*
Hirmann, Georg, 3,975,989.

Honeywell Inc.: *See—*
Braitberg, Michael F.; and Lee, Tzuo-Chang, 3,976,354.
Krakow, Burton, 3,976,883.
McConnell, Robert G., 3,976,914.
McConnell, Robert G., 3,976,915.
Petersen, Paul E.; and Schulze, Richard G., 3,976,872.

Honeywell Information Systems, Inc.: *See—*
Betz, Bernard K., 3,976,844.
Parkinson, Kelvin L.; and Austin, Joseph M., 3,976,979.
Patterson, Garvin Wesley; and Porter, Marion G., 3,976,978.
Porter, Marion G.; Patterson, Garvin Wesley; Shelly, William A.; and Lemak, Nicolas S., 3,976,977.

Honeywell Information Systems Limited: *See—*
Ramage, William, 3,976,856.

Honjo, Satoru; Tamai, Yasuo; and Tsuji, Nobuo, to Xerox Corporation. Imaging systems. 3,976,808, Cl. 427-17.000.

Hood, Henry Alexander, to Wall Industries, Inc. Method and apparatus for manufacturing faired article. 3,975,980, Cl. 87-6.000.

Hooker Chemicals & Plastics Corporation: *See—*
Carlson, Richard D., 3,976,722.
Falvo, Ralph, 3,976,549.
Fuller, Willard A., 3,976,758.
Golborn, Peter; and Duffy, James J., 3,976,620.
Houston, James E.; Gingrich, Reynard W.; and Schilt, Earl A., 3,976,430.

Hoover Company, The: *See—*
Oxel, Berton R., 3,976,000.

Hoover, John R. E.; and Yu-Wen Jen, Timothy, to SmithKline Corporation. Cephalosporin intermediates and process therefor. 3,976,641, Cl. 260-243.00R.

Hope, Bjorn R., to Navaltronic A/S. Apparatus for level measurement of free flowing substances, solid substances or combination of these in tanks, containers, reservoir or the like. 3,975,958, Cl. 73-290.00V.

Hopfe, Dieter H., to Mark Products, Inc. Electrical connector. 3,976,351, Cl. 339-99.00R.

Horn, Herbert: *See—*
Young, Larry L.; Horn, Herbert; and Endres, Joseph G., 3,976,798.

Horvath, Steven Joseph: *See—*
Geiger, Kenneth Daniel; Horvath, Steven Joseph; Niessen, Paul; and Seymour, Theodore Joseph, 3,976,405.

Houdaille Industries, Inc.: *See—*
Frazier, James L., 3,975,817.
Kaufmann, Harold, 3,976,005.

Houlihan, William J.: *See—*
Nadelson, Jeffrey; and Houlihan, William J., 3,976,634.

Houston, James E.; Gingrich, Reynard W.; and Schilt, Earl A., to Hooker Chemicals & Plastics Corporation. Forced circulation cooling crystallizer. 3,976,430, Cl. 23-273.00R.

Hovey, William P.; and Kubiak, James J., to Dow Chemical Company, The. Preparation of curved composite panel containing a rigid foamed plastic. 3,976,526, Cl. 156-212.000.

Howaldtswerke-Deutsche Werft Aktiengesellschaft Hamburg und Kiel: *See—*
Steenken, Heinz W. L.; and Luth, Detlef G. H., 3,975,841.
Walter, Gerhard H. W.; and Pietsch, Gunter E. W., 3,976,534.

Howells, Francis Thomas; and Newman, John Maldwyn, to Newman-Howells Associates Limited. Automatic article immersion apparatus. 3,976,028, Cl. 118-6.000.

Hoyt, Clifton A., to Hayward Research, Inc. Analog rate changer. 3,976,842, Cl. 179-15.55T.

Hubbard, Winchester Loomis: *See—*
Strunk, Richard J.; and Hubbard, Winchester Loomis, 3,976,672.

Huddleston, George: *See—*
Moore, Thomas A.; Gehman, Earl; and Huddleston, George, 3,976,999.

Hughes Aircraft Company: *See—*
Fraas, Lewis M.; and Bleha, William P., Jr., 3,976,361.

Hughes, John Lawrence; Liu, Robert Chung-Huan; Enkoji, Takashi; and Bastian, James Winslow, to Armour Pharmaceutical Company. Pharmaceutical guanidine preparations and methods of using same. 3,976,787, Cl. 424-326.000.

Hujer, Friedrich, to AGFA-Gevaert, A.G. Protecting strips of photographic film. 3,976,376, Cl. 355-133.000.

Hull, Bradford N.: *See—*
McIntosh, Harold A.; Randolph, Hollis L.; and Hull, Bradford N., 3,976,966.

Hung, Wendell L. Y.: *See—*
Csathy, Denis G.; Hung, Wendell L. Y.; and Heath, Jon M., 3,976,033.

Hunke, Friedrich: *See—*
Hench, Hans, Sr.; Hunke, Friedrich; and Wolber, Claus, 3,976,254.

Hunt, John Owen, to Dowty Rotol Limited. Rotary actuators suitable for bladed rotors. 3,976,397, Cl. 416-154.000.

Hunter, Joe S.; Bailey, Escar L.; and Little, Little J., to United States of America, Army. Fluidic transverse-impact modulator accelerometer. 3,975,961, Cl. 73-515.000.

Hupp, Danny R. Concrete mixer trailer. 3,976,284, Cl. 259-168.000.

Husch, Robert Leo, to Interstate Foods Corporation. Method and composition for treating edible oils and inedible tallows. 3,976,671, Cl. 260-428.000.

Huser, Heinz: *See—*
Kluger, Wolfgang; and Huser, Heinz, 3,976,331.

Hutton, Walter C. Pipe tapping tool. 3,976,091, Cl. 137-318.000.

Hyakutake, Yasuhiko; and Andou, Takao, to Nissan Motor Co., Ltd. Vaned impeller wheel for torque converter. 3,976,398, Cl. 416-180.000.

Hydrocarbon Research, Inc.: *See—*
Shen, John; and Chervenak, Michael C., 3,976,557.

Hyler, John H.: *See—*
Eaton, Lyle E.; and Hyler, John H., 3,975,906.

I-T-E Imperial Corporation: *See—*
Clark, William R., 3,976,918.

Ibe, Hiroshi: *See—*
Kudo, Norihiro; and Ibe, Hiroshi, 3,976,494.

ICI Australia Limited: *See—*
Hayward, Malcolm Edwin; and Maier, Volker Elmar, 3,976,629.

ICN Pharmaceuticals, Inc.: *See—*
Witkowski, Joseph T.; and Robins, Roland K., 3,976,545.

Idemitsu, Kosan Kabushiki-Kaisha (Idemitsu Kosan Co., Ltd.): *See—*
Kaji, Hidehiko; Matsumoto, Takeshi; Sugi, Norio; Ikenaga, Atsuo; Iwata, Shoichi; and Tomikawa, Masami, 3,976,612.

Ihde, Richard C.: *See—*
Thompson, Kenneth; and Ihde, Richard C., 3,976,527.

Ikeda, Tadashi: *See—*
Hinata, Masanao; Takei, Haruo; Sato, Akira; and Ikeda, Tadashi, 3,976,492.

Ikeda, Yutaka: *See—*
Sekido, Satoshi; Ohhira, Tsukasa; Ikeda, Yutaka; and Yokoyama, Takao, 3,976,502.

Ikenaga, Atsuo: *See—*
Kaji, Hidehiko; Matsumoto, Takeshi; Sugi, Norio; Ikenaga, Atsuo; Iwata, Shoichi; and Tomikawa, Masami, 3,976,612.

Ilmeg AB: *See—*
Jysky, Goran; Mardla, Ilmar; and Ericsson, Bjorn, 3,975,831.

Imanari, Makoto: *See—*
Nakajima, Fumito; Tekeuchi, Masato; Matsuda, Shimpei; Uno, Shigeo; Mori, Toshikatsu; Watanabe, Yoshihisa; and Imanari, Makoto, 3,976,745.

Imperial Chemical Industries Limited: *See—*
Bramley, Donald; Davies, Gerald Thomas; and Watson, David, 3,975,807.
Coles, Gerald Christopher; and Landquist, Justus Kenneth, 3,976,784.
Giovanelli, Anton Alfred Arthur; and Schmidt, Eckhard Wolfgang, 3,976,820.

Inamoto, Yoshiaki: *See—*
Takaishi, Naotake; Inamoto, Yoshiaki; and Tsuchihashi, Kiyoshi, 3,976,706.
Takaishi, Naotake; Inamoto, Yoshiaki; and Tsuchihashi, Kiyoshi, 3,976,707.
Takaishi, Naotake; Inamoto, Yoshiaki; and Tsuchihashi, Kiyoshi, 3,976,708.
Takaishi, Naotake; Inamoto, Yoshiaki; and Tsuchihashi, Kiyoshi, 3,976,709.
Takaishi, Naotake; Inamoto, Yoshiaki; and Tsuchihashi, Kiyoshi, 3,976,710.
Takaishi, Naotake; Inamoto, Yoshiaki; and Tsuchihashi, Kiyoshi, 3,976,711.
Takaishi, Naotake; Inamoto, Yoshiaki; and Tsuchihashi, Kiyoshi, 3,976,712.

Inatomi, Makoto: *See—*
Katayama, Hiroyuki; and Inatomi, Makoto, 3,976,473.

Ingersoll-Rand Research Inc.: *See—*
Kevorkian, Victor; and Cumings, Francis J., 3,976,548.

Inouye, Sakae; Kurahashi, Suminobu; Wada, Norio; Kikuchi, Motokazu; Masuda, Kinji; Akiyama, Tsuneharu; and Osaki, Toshiyuki, to Bridgestone Tire Company Limited. Method for improving adhesion of metallic material with vulcanizable rubber composition. 3,976,624, Cl. 260-79.50B.

Instapak Corporation: *See—*
Sperry, Charles R., 3,976,230.

International Basic Economy Corporation: *See—*
Raymond, Robert E., 3,976,098.

International Business Machines Corporation: *See—*
Babinski, John Paul; Bertelsen, Bruce Irving; Raacke, Karl Heinz; Sirgo, Valdeko Harry; and Townsend, Clarence Jay, 3,976,330.
Bruer, James Dudley, 3,976,300.
Criscimagna, Tony N.; and Steinmetz, Michael J., 3,976,992.
Cuomo, Salvatore Ralph, Jr., 3,976,288.
Eiselen, Everett Truman, 3,976,982.
Enger, Thomas Arthur, 3,976,865.
Erickson, Byron Ted; and Hilton, Howard Thorndike, 3,977,010.
Feng, Bai-Cwo, 3,976,524.
Johnson, William Stanford, 3,976,511.

International Electronic Research Corporation: *See—*
Spurling, John E.; Hodek, Jiri G.; and Kessels, Edward J., 3,975,805.

International Flavors & Fragrances Inc.: *See—*
Hall, John B.; Tseng, Ching Y.; Vock, Manfred Hugo; Vinals, Joaquin; and Shuster, Edward J., 3,976,801.

International Harvester Company: *See—*
Kerber, Dathan R.; Benson, Richard E.; and VandeWiele, John L., 3,975,889.

International Nickel Company, Inc., The: *See—*
Blanco, Jose A.; Wortman, Gregory G.; Babjak, Juraj; and Itzkovitch, Irwin J., 3,976,742.
Larson, Jay Michael, 3,976,482.

International Shoe Machine Corporation: *See—*
Vornberger, Walter, 3,975,932.

International Standard Electric Corporation: *See—*
Barton, Paul, 3,977,002.
Thompson, George H. B., 3,976,358.

International Telephone and Telegraph Corporation: *See—*
Sapir, Said, 3,976,954.

Internationella Siporex Aktiebolaget: *See*—
Goransson, Rolf Erik, 3,976,205.
Interstate Foods Corporation: *See*—
Husch, Robert Leo, 3,976,671.
Intra-Science Research Foundation: *See*—
Kharasch, Norman; and Khodair, Ahmed I., 3,976,678.
Irie, Yoshio: *See*—
Ishikawa, Kazuo; Irie, Yoshio; and Mifune, Hideo, 3,976,854.
Irihara, Koichi: *See*—
Miyata, Shizuo; Nakao, Yoshihide; Irihara, Koichi; Kawai, Ryoichi; and Nakao, Motokazu, 3,976,372.
Irik, Harry, to Grantham & Oleson, Inc. Transportable cable reel. 3,976,260, Cl. 242-86.50R.
Irving, Leonard David; Pattison, James Edward; and Rees, Huw David, to British Secretary of State for Defence. Silver, gallium, and oxygen contact for indium phosphide. 3,977,015, Cl. 357-3.000.
Isaacson, Max; and Smilg, Benjamin, to Vibrodyne, Inc. Vibratory apparatus and method. 3,975,863, Cl. 51-163.100.
ISF SpA: *See*—
Pifferi, Giorgio, 3,976,673.
ISG International Incorporated: *See*—
Lowe, James N.; and Gregory, Earl, 3,976,741.
Ishigaki, Yoshio; and Okada, Takashi, to Sony Corporation. Gain control circuits utilizing a novel semiconductor device. 3,976,951, Cl. 330-29.000.
Ishiguro, Kazuhiko: *See*—
Shinohara, Hiroshi; Masunaga, Kunihiko; Kondo, Toshihito; and Ishiguro, Kazuhiko, 3,976,034.
Ishikawa, Kazuo; Irie, Yoshio; and Mifune, Hideo, to Matsushita Electric Industrial Co., Ltd. Constant-temperature heater. 3,976,854, Cl. 219-505.000.
Ishikawajima-Harima Jukogyo Kabushiki Kaisha: *See*—
Nakajima, Chugi, 3,975,991.
Ishino, Yoshio: *See*—
Watanabe, Sumio; Kayano, Masanori; Ishino, Yoshio; and Miyao, Kohei, 3,976,764.
Ishitani, Akiyasu, to Sony Corporation. Multi-channel junction gated field effect transistor and method of making same. 3,977,017, Cl. 357-22.000.
Itek Corporation: *See*—
Barnes, William P., Jr.; and Wirtenson, G. Richard, 3,976,890.
Itoh, Masumi, to Fujisawa Pharmaceutical Co., Ltd. Novel esterifying agents, and their production and use. 3,976,635, Cl. 260-239.100.
Itoh, Tsutomu, to Onoda Cement Company, Ltd. Electric discharge coating apparatus. 3,976,031, Cl. 118-629.000.
ITT Industries, Inc.: *See*—
Belart, Juan, 3,976,171.
Itzkovitch, Irwin J.: *See*—
Blanco, Jose A.; Wortman, Gregory G.; Babjak, Juraj; and Itzkovitch, Irwin J., 3,976,742.
IVA Gebr. Ten Vaarwerk B.V.: *See*—
Baghuis, Ludovicus Hendrikus, 3,976,289.
Ivankin, Dmitry Petrovich: *See*—
Chestnov, Valery Fedorovich; and Ivankin, Dmitry Petrovich, 3,976,461.
Iwakawa, Tunekiyo; and Yano, Akira, to Nippon Electric Company, Ltd. Gas-discharge display panel having a third group of electrodes forming control discharge spaces. 3,976,971, Cl. 340-324.00M.
Iwama, Kiyonori: *See*—
Tamura, Masahiko; Iwama, Kiyonori; Yoshimi, Toshikazu; and Oyaba, Takashi, 3,976,897.
Iwata, Shoichi: *See*—
Kaji, Hidehiko; Matsumoto, Takeshi; Sugi, Norio; Ikenaga, Atsuo; Iwata, Shoichi; and Tomikawa, Masami, 3,976,612.
J. I. Case Company: *See*—
Maurer, Herman J.; and Baker, Donald C., 3,976,156.
Ralston, Harold A.; and Venable, Phillip G., 3,976,144.
Jack, James; and Gray, Derek Cory, to Bakelite Xylonite Limited. Extrusion processes and apparatus therefor. 3,976,410, Cl. 425-71.000.
Jackson, Jordan S., to Pyles Industries, Inc. Hot melt dispensing apparatus. 3,976,229, Cl. 222-146.0HE.
Jacobsen, Stephen C.; Smith, Homer R.; and Koncher, Tawny R., to University of Utah, The. Dialyzer cartridge. 3,976,576, Cl. 210-321.00B.
Jager, Michael: *See*—
Hildebrandt, Jurgen J.; Zahn, Paul; Witt, Alfred Nikolaus; and Jager, Michael, 3,976,060.
James, Albert L., to Cadillac Products, Inc. Laminating method. 3,976,528, Cl. 156-244.000.
Jandrasi, Frank J.; and Purvis, Howard A., to Tapco International, Inc. Guided slide valve. 3,976,094, Cl. 137-375.000.
Janson, Richard W. Double track drapery guide assembly. 3,975,792, Cl. 16-87.40R.
Janssen, Peter Johannes Michiel, to U.S. Philips Corporation. Arrangement for aligning the image of an information structure on a converter. 3,976,828, Cl. 178-6.60R.
Jansz, Joost Werner, to Hollandsche Beton Groep N.V. Piledriving. 3,975,918, Cl. 61-53.500.
Japan Atomic Energy Research Institute: *See*—
Tagawa, Hiroaki, 3,976,750.
Japan Exlan Company Limited: *See*—
Sekiguchi, Hideto; Sone, Masao; and Sato, Mitsunori, 3,976,737.
Jarrett, Boaz Antony, to C.A.V. Limited. Fuel injection systems for internal combustion engines. 3,976,249, Cl. 239-533.000.
Jass, Herman E.; and Kohlhepp, Frederick F., to Carter-Wallace, Inc. Aerosol package. 3,976,223, Cl. 222-94.000.
Jean, Andre Camille: *See*—
Fieuzal, Jean Henri; Bourgine, Louis Gaston; Jean, Andre Camille; and Benzoni, Rene Pierre, 3,976,266.
Jeffreys, George C.: *See*—
Krug, Laurence M., 3,976,458.
Jenkins, Richard Charles Lloyd. Optical dielectric waveguides. 3,976,356, Cl. 350-96.0WG.
Jensen, Robert L. Rotary vane fluid pressure machine. 3,976,403, Cl. 418-32.000.
Jeumont-Schneider: *See*—
Picandet, Jean, 3,976,841.
Joh. Vaillant, K.G.: *See*—
Meier, Hans; and Wille, Andreas, 3,976,452.
John Wyeth & Brother Limited: *See*—
Curran, Adrian Charles Ward; and Crossley, Roger, 3,976,683.
Curran, Adrian Charles Ward, 3,976,773.
White, Alan Chapman, 3,976,645.
Johnson Controls, Inc.: *See*—
Rudich, George, Jr., 3,976,925.
Johnson, David E., to Mobil Oil Corporation. Sealing arrangement for an extrusion apparatus. 3,976,285, Cl. 259-191.000.
Johnson, Glen E., to Electro Fuel, Inc. Fuel activation apparatus. 3,976,726, Cl. 261-1.000.
Johnson, Homer R.: *See*—
Repik, Albert J.; Miller, Charles E.; and Johnson, Homer R., 3,976,597.
Johnson & Johnson: *See*—
Levin, Norman A., 3,976,601.
Johnson, Keith O.; and Coffman, Fredrick M., to Exxon Nuclear Company, Inc. Leak detector probe for fuel rods. 3,975,949, Cl. 73-71.50R.
Johnson, Lawrence A.; and Walters, Larry A., to SCM Corporation. Encapsulation of sugar and its use in sweetened coconut. 3,976,794, Cl. 426-103.000.
Johnson, Martin Stanley, to Marston Radiators Limited. Detection apparatus. 3,976,121, Cl. 165-11.000.
Johnson, Michael R., to Pfizer Inc. Process for preparing optically active 6,7-dimethoxy-2-methyl-4-oxo-1,2,3,4-tetrahydro-1-quinoline carboxylic acid ester analgesics. 3,976,650, Cl. 260-287.00K.
Johnson, Norman Allen. Self-aligning grapple swivel. 3,976,322, Cl. 294-111.000.
Johnson, Philip C. Slow start hydraulic valve. 3,976,090, Cl. 137-117.000.
Johnson, William Stanford, to International Business Machines Corporation. Method for fabricating integrated circuit structures with full dielectric isolation by ion bombardment. 3,976,511, Cl. 148-1.500.
Jones, Dennis G.: *See*—
Sorice, Edward L.; and Jones, Dennis G., 3,975,809.
Jones, Ronald O., Sr., to Ron Jones Marine Engineering, Inc. Strut drive mechanism. 3,976,027, Cl. 115-35.000.
Jones, Wickliffe, to R. A. Jones & Company, Inc. Method and apparatus for forming, filling and sealing packages. 3,975,888, Cl. 53-386.000.
Jonsson, Bror Allan, to Cranab Aktiebolag. Tree-cutting device for lumbering machine. 3,976,111, Cl. 144-34.00R.
Joosen, Joos D.: *See*—
van der Molen, Theodorus J.; Meijer, Louis A.; and Joosen, Joos D., 3,976,631.
Jorigny, Gerard Andre; Royer, Jacques; and Trichard, Georges Edmond, to U.S. Philips Corporation. Matrix printer comprising one or more stackable groups of printing wires. 3,976,180, Cl. 197-1.00R.
Julliand, Michel Henri: *See*—
Hoch, Rene Gerard; and Julliand, Michel Henri, 3,976,160.
Junghans, Rudi; and Czotscher, Ernst, to Heidelberger Druckmaschinen Aktiengesellschaft. Washing device adjustable with respect to the blanket cylinder. 3,976,007, Cl. 101-425.000.
Junginger, Gerhard; and Zeeb, Helmut, to Hewlett-Packard GmbH. Respiration monitor. 3,976,052, Cl. 128-2.10Z.
Just, Anthony H. Easy-lock removable door hinge. 3,975,793, Cl. 16-171.000.
Juzenko, Maurice J., to Garcia Corporation. Molded athletic boot and method of making same. 3,975,840, Cl. 36-117.000.
Jysky, Goran; Mardla, Ilmar; and Ericsson, Bjorn, to Ilmeg AB. Directing instrument. 3,975,831, Cl. 33-333.000.
Kabushiki Kaisha Kumahira Seisakusho: *See*—
Hinohara, Kango; Nishikawa, Makoto; Yokomoto, Noriaki; and Matsumura, Kenichi, 3,976,974.
Kabushiki Kaisha Suwa Seikosha: *See*—
Naito, Okito, 3,975,897.
Nishimura, Izuhiko, 3,975,898.
Kabushiki Kaisha Toyoda Jidoshokki Seisakusho: *See*—
Katoh, Takashi; Hidaka, Hideo; and Oda, Singo, 3,975,798.
Kahn, Friedhelm. Method for casting material under pressure. 3,976,118, Cl. 164-119.000.
Kaiser, Carl; and Ross, Stephen T., to SmithKline Corporation. α-Aminoalkyl-4-hydroxy-3-alkylsulfonylmethylphenyl ketones. 3,976,694, Cl. 260-570.50C.
Kaiser, Carl; and Ross, Stephen R., to SmithKline Corporation. Halogen substituted α-(aminoalkyl)-3,4-dihydroxybenzyl alcohols. 3,976,695, Cl. 260-570.600.
Kaiser, Danny K., to Dover Corporation. Filter unit with protected valve controllers. 3,976,577, Cl. 210-333.00R.
Kaiser, Donald Bernard: *See*—
Longsderff, Richard William; and Kaiser, Donald Bernard, 3,976,956.

Kaiser, Kenneth L.; and Stowik, William, to Vollrath Refrigeration, Inc. Spring hinge. 3,975,794, Cl. 16-189.000.

Kaji, Hidehiko; Matsumoto, Takeshi; Sugi, Norio; Ikenaga, Atsuo; Iwata, Shoichi; and Tomikawa, Masami, to Idemitsu, Kosan Kabushiki-Kaisha (Idemitsu Kosan Co., Ltd.). Polyethylene composition. 3,976,612, Cl. 260-23.00R.

Kaji, Tadao; and Katsube, Takeki, to Hitachi, Ltd. Method of forming closely spaced electrodes onto semiconductor device. 3,975,818, Cl. 29-578.000.

Kalnin, Igor Martynovich; Tsirlin, Beniamin Lvovich; Bukhter, Elena Zalmanovna; Terenina, Alexandra Dmitrievna; Eremkina, Galina Ivanovna; Poteiko, Andrei Ivanovich; and Breslov, Khanon Yakovlevich. Multiple-stage centrifugal compressor. 3,976,395, Cl. 415-199.00A.

Kalopissis, Gregoire, to L'Oreal. Process and cosmetic compositions for the treatment of skin and scalp. 3,976,781, Cl. 424-309.000.

Kamezawa, Yasutoki: *See*—
Nihyakumen, Kouzi; Yokoyama, Taizo; Ueda, Yasuo; Kamezawa, Yasutoki; and Aizawa, Tatsuo, 3,976,488.

Kamimura, Haruo; Yamashita, Yukio; Nakai, Toshitugu; Wadano, Katsumi; Amada, Kozo; and Matsuda, Yoshitane, to Nippon Kokan Kabushiki Kaisha. Method and apparatus for supplying plugs to plug mills. 3,975,937, Cl. 72-209.000.

Kaminsky, Valery Naumovich: *See*—
Morgulis, Jury Borisovich; Povetkin, German Mitrofanovich; Kaminsky, Valery Naumovich; and Kochetov, Vyacheslav Alexandrovich, 3,975,911.

Kaminstein, Bernard; and Uhl, Wyman F. Gelled fire extinguisher fluid comprising polyacrylamide and bentonite. 3,976,580, Cl. 252-2.000.

Kamyr Aktiebolag: *See*—
Gullichsen, Johan E.; and Ekholm, Rolf G., 3,976,538.

Kantor, Sidney: *See*—
Diehl, Robert Eugene; Schrider, Michael Stanley; and Kantor, Sidney, 3,976,785.

Kao Soap Co., Ltd.: *See*—
Takaishi, Naotake; Inamoto, Yoshiaki; and Tsuchihashi, Kiyoshi, 3,976,706.
Takaishi, Naotake; Inamoto, Yoshiaki; and Tsuchihashi, Kiyoshi, 3,976,707.
Takaishi, Naotake; Inamoto, Yoshiaki; and Tsuchihashi, Kiyoshi, 3,976,708.
Takaishi, Naotake; Inamoto, Yoshiaki; and Tsuchihashi, Kiyoshi, 3,976,709.
Takaishi, Naotake; Inamoto, Yoshiaki; and Tsuchihashi, Kiyoshi, 3,976,710.
Takaishi, Naotake; Inamoto, Yoshiaki; and Tsuchihashi, Kiyoshi, 3,976,711.
Takaishi, Naotake; Inamoto, Yoshiaki; and Tsuchihashi, Kiyoshi, 3,976,712.

Kapral, Ales M. Method of decorating plastic surface by transferable imprint. 3,976,731, Cl. 264-46.400.

Kaprielian, Roy M.: *See*—
Seferian, Rupen B.; and Kaprielian, Roy M., 3,976,467.

Karanian, Arthur J.; and O'Brien, Robert L., to United States of America, Navy. Dual side-mounted inlet-vehicle orientation. 3,976,088, Cl. 137-15.100.

Karcher, Charles, to Ruti Machinery Works Ltd. Device for fluid insertion of the filling thread on a loom. 3,976,107, Cl. 139-435.000.

Kardas, James R.: *See*—
Breen, Max; and Kardas, James R., 3,976,047.

Karger, Eva R.; and MacGregor, Paul T., to Polaroid Corporation. 1:1 Adducts of 1-naphthol and (Na)phthalaldehydic acid. 3,976,662, Cl. 260-343.20R.

Karl Kroyer St. Anne's Limited: *See*—
Attwood, Brian William; and Hicklin, Denis Raymond, 3,976,412.

Karl Mengele & Sohne: *See*—
Santic, Blaz, 3,976,191.

Kasama, Noriyuki, to Citizen Watch Co., Ltd. Switching device for electronic timepiece. 3,975,896, Cl. 58-23.00R.

Kass, Gerald H., deceased; and by Knauer, Frederick O., administrator, to Anderson Brass Company. Valve. 3,976,096, Cl. 137-493.200.

Katayama, Hiroyuki; and Inatomi, Makoto, to Nippon Steel Corporation. Method for producing an extremely low carbon and nitrogen steel in a vacuum refining apparatus. 3,976,473, Cl. 75-49.000.

Katayama, Morio, to Gondra Industries & Co. Fastening snap. 3,975,803, Cl. 24-217.00R.

Kato, Nobuyuki: *See*—
Kubo, Takao; Ohtani, Tadao; Kojima, Shigeru; Kato, Nobuyuki; Kojima, Kiyoshi; Sakamoto, Yoichi; Konno, Isago; and Tsukahara, Masaharu, 3,976,519.

Katoh, Takashi; Hidaka, Hideo; and Oda, Singo, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho. Safety device of a carding machine provided with a pair of crushing rollers. 3,975,798, Cl. 19-98.000.

Katsube, Takeki: *See*—
Kaji, Tadao; and Katsube, Takeki, 3,975,818.

Kaufmann, Harold, to Houdaille Industries, Inc. Printing plate for use with lockup means. 3,976,005, Cl. 101-395.000.

Kawai, Ryoichi: *See*—
Miyata, Shizuo; Nakao, Yoshihide; Irihara, Koichi; Kawai, Ryoichi; and Nakao, Motokazu, 3,976,372.

Kawakami, Hideaki, to Hitachi, Ltd. Method of driving liquid crystal matrix display device. 3,976,362, Cl. 350-160.0LC.

Kawakubo, Kazuo; Takahashi, Isao; and Sugiura, Susumu, to Canon Kabushiki Kaisha. Electrophotographic copying apparatus with reciprocating recording medium carrier. 3,976,373, Cl. 355-10.000.

Kawamoto, Isao: *See*—
Nara, Takashi; Takasawa, Seigo; Okachi, Ryo; Kawamoto, Isao; Yamamoto, Mitsuyoshi; Sato, Seiji; and Sato, Tomoyasu, 3,976,768.

Kawana, Yoshiyuki: *See*—
Matsushita, Takeshi; and Kawana, Yoshiyuki, 3,977,019.

Kawano, Hideo: *See*—
Kubotera, Kikuo; Mizuki, Eiichi; Kawano, Hideo; and Fujiwara, Tadahiro, 3,976,487.

Kawasaki, Hideo: *See*—
Ueno, Eichiro; Kawasaki, Hideo; and Shigita, Syozo, 3,976,425.

Kawolics, Raymond P.: *See*—
Basel, Donald R.; and Kawolics, Raymond P., 3,976,277.

Kay, Thomas D. Head-positioning scintillation camera and head holder therefor. 3,976,051, Cl. 128-2.00A.

Kayano, Masanori: *See*—
Watanabe, Sumio; Kayano, Masanori; Ishino, Yoshio; and Miyao, Kohei, 3,976,764.

Keglewitsch, Josef, to Bunker Ramo Corporation. Electrical connector assembly having insulated insulation piercing contact portions. 3,976,350, Cl. 339-97.00P.

Kehoe, Thomas J., to Beckman Instruments, Inc. Completely, draining, nonleaking pneumatic valve. 3,976,104, Cl. 137-806.000.

Keiper KG: *See*—
Wirtz, Egon; and Ligensa, Karl Heinz, 3,976,327.

Keller, Wolfgang, to Siemens Aktiengesellschaft. Method for producing a controlled radial path of resistance in a semiconductor monocrystalline rod. 3,976,536, Cl. 156-620.000.

Kelly, John R.: *See*—
Kelly, William H., Jr.; and Kelly, John R., 3,976,799.

Kelly, Robert C., to Upjohn Company, The. Steffimycinone, 7-deoxysteffimycinone and derivatives. 3,976,667, Cl. 260-365.000.

Kelly, William H., Jr.; and Kelly, John R. Method for making carnivore food. 3,976,799, Cl. 426-311.000.

Kemos, Incorporated: *See*—
Dillinger, Edward George, 3,976,531.

Kendall Company, The: *See*—
Dye, John F.; Binard, William J.; and Patel, Bhupendra C., 3,976,278.

Kendall, Giles A.; and Robertson, James E., to Menasco Manufacturing Company. Shock isolator construction. 3,976,287, Cl. 267-139.000.

Kennametal Inc.: *See*—
Sorice, Edward L.; and Jones, Dennis G., 3,975,809.

Kennedy, Charles J., to C. J. Kennedy Company. Magnetic tape cartridge recorder having releasable cartridge catch arrangement and non-resonant type drive. 3,976,262, Cl. 242-192.000.

Kenney, William J.: *See*—
Fleischmann, Lester K.; Kenney, William J.; and Fleischmann, David L., 3,976,183.

Kenyon, Lewis W.; and Grindle, James L., to General Electric Company. Electrical socket. 3,976,349, Cl. 339-95.00R.

Kerber, Dathan R.; Benson, Richard E.; and VandeWiele, John L., to International Harvester Company. Harvesting combine and separate quick attach crop pickup components therefor. 3,975,889, Cl. 56-2.000.

Kerfoot, Franklin W., Jr. Eye surgery device. 3,976,077, Cl. 128-305.000.

Kerr, Robert Michael, to CCL Systems Limited. Anchorage assembly for use in the prestressing of concrete structures. 3,975,799, Cl. 24-122.600.

Kershaw, Joseph E., to United States of America, Navy. Conformal helmet antenna. 3,977,003, Cl. 343-702.000.

Kervistin, Robert: *See*—
Hallinger, Claude Christian; and Kervistin, Robert, 3,975,901.

Kessels, Edward J.: *See*—
Spurling, John E.; Hodek, Jiri G.; and Kessels, Edward J., 3,975,805.

Ketek Electric Corporation: *See*—
Schachter, Jacob, 3,976,199.

Kevorkian, Victor; and Cumings, Francis J., to Ingersoll-Rand Research Inc. Apparatus for processing coal and like material. 3,976,548, Cl. 202-118.000.

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Khesin, Arkady Yakovlevich: *See*—
Alien, Imant Karlovich; Avdeev, Ivan Ivanovich; Gelfandbein, Yakov Aronovich; Ershov, Boris Nikolaevich; Nikonenko, Anatoly Vasilievich; Popov, Jury Olegovich; Khesin, Arkady Yakovlevich; and Yanson, Boris Albertovich, 3,976,827.

Khodair, Ahmed I.: *See*—
Kharasch, Norman; and Khodair, Ahmed I., 3,976,678.

Khosharian, Vartan N., to United States of America, Navy. Method and means to access and extended memory unit. 3,976,976, Cl. 340-172.500.

Khosla, Mahesh Chandra: *See*—
Bumpus, Francis Merlin; Khosla, Mahesh Chandra; and Smeby, Robert Rudolph, 3,976,770.

Kikuchi, Motokazu: *See*—
Inouye, Sakae; Kurahashi, Suminobu; Wada, Norio; Kikuchi, Motokazu; Masuda, Kinji; Akiyama, Tsuneharu; and Osaki, Toshiyuki, 3,976,624.

Kim, Whan Jong. Convertible blanket adapted to form a tote bag. 3,976,113, Cl. 150-12.000.

Kimberly-Clark Corporation: *See—*
Dunning, Charles E.; and Day, Winterton U., 3,976,734.
Kimura, Ryoichi: *See—*
Hirai, Akiyoshi; Yamamoto, Masachika; and Kimura, Ryoichi, 3,976,167.
Kinjo, Hisao: *See—*
Haneji, Yasuo; and Kinjo, Hisao, 3,977,024.
Kirjavainen, Alvi, to Valmet Oy. Adjustable slice for the headbox or the like of a paper or equivalent machine. 3,976,539, Cl. 162-344.000.
Kishimoto, Yoshinobu: *See—*
Mori, Kunihito; Kobayashi, Akira; Kishimoto, Yoshinobu; Ohmichi, Yukinobu; and Nakamura, Masatatsu, 3,975,832.
Kitamura, Shuji: *See—*
Mori, Atsuo; Tsuji, Kozo; and Kitamura, Shuji, 3,976,819.
Klein, Dieter H.: *See—*
Elms, W. Jay; and Klein, Dieter H., 3,976,614.
Klein, Gerhart P., to P. R. Mallory & Co. Inc. Porous electrodes and electrolytic capacitors made therefrom. 3,976,435, Cl. 29-192.00R.
Kleinschmit, Einhard: *See—*
Trachte, Kurt; Willingshofer, Walter; and Kleinschmit, Einhard, 3,976,338.
Klimanov, Alexandr Sergeevich: *See—*
Dudko, Daniil Andreevich; Samsonov, Grigory Valentinovich; Maximovich, Bolesiav Ivanovich; Zelenin, Vitaly Ivanovich; Klimanov, Alexandr Sergeevich; Potseluiko, Vladimir Nikolaevich; Trunov, Gennady Vasilievich; and Sleptsov, Vasily Mikhailovich, 3,976,481.
Klimboff, Morris; and Harvey, Wilfred G., Sr., to Powers-FIAT Corporation. Fixture installation assembly. 3,975,781, Cl. 4-170.000.
Klingler, Josef F., to Thermex, Inc. Method of forming a thermometer structure. 3,976,740, Cl. 264-229.000.
Klitzke, Kermit A.: *See—*
Branson, Donald M.; and Klitzke, Kermit A., 3,975,857.
Klockner-Humboldt-Deutz Aktiengesellschaft: *See—*
Mettig, Hermann; and Medenus, Bernhard, 3,976,041.
Klopfer, Henry Edward, to Raychem Corporation. Method and apparatus for splicing lines. 3,976,385, Cl. 403-284.000.
Klosterfrau Berlin GmbH: *See—*
Deininger, Rolf; and Wolf, Erich, 3,976,800.
Kluger, Wolfgang; and Huser, Heinz, to Polysius AG. Vertical feeder for powdered material. 3,976,331, Cl. 302-53.000.
Knauer, Frederick O., administrator: *See—*
Kass, Gerald H., deceased; and Knauer, Frederick O., administrator, 3,976,096.
Knight, Charles A.: *See—*
Altschuler, Samuel; Traylor, Frank T.; Ziemer, Richard W.; and Knight, Charles A., 3,976,008.
Knoble, David W.: *See—*
Owens, Michael; and Knoble, David W., 3,976,910.
Knuth, Kurt E.: *See—*
Berry, James M.; Hauser, Anthony J.; Knuth, Kurt E.; and Ollendick, Gary B., 3,977,007.
Kobayashi, Akihiro: *See—*
Sekiguchi, Kouichi; and Kobayashi, Akihiro, 3,976,846.
Kobayashi, Akira: *See—*
Mori, Kunihito; Kobayashi, Akira; Kishimoto, Yoshinobu; Ohmichi, Yukinobu; and Nakamura, Masatatsu, 3,975,832.
Kobayashi, Toshiaki: *See—*
Tomita, Kenichi; Yanagi, Mitsuo; and Kobayashi, Toshiaki, 3,976,789.
Kobayashi, Yoshikazu; and Harada, Masachika, to Nippon Columbia Kabushiki Kaisha. Color video disc, apparatus for making the same and reproducing apparatus therefor. 3,977,021, Cl. 358-4.000.
Koch, Evaristo; and Schwizer, Kilian. Coin release operated locking device. 3,976,178, Cl. 194-67.000.
Koch, Keith E.: *See—*
Grawey, Charles E.; Untz, Robert W.; Koch, Keith E.; and Gekhardt, Charles F., 3,976,116.
Koch, Ulrich H.; and Voudy, Thomas A., to Whitey Research Tool Co. Operating member locking device. 3,976,095, Cl. 137-385.000.
Kochetov, Vyacheslav Alexandrovich: *See—*
Morgulis, Jury Borisovich; Povetkin, German Mitrofanovich; Kaminsky, Valery Naumovich; and Kochetov, Vyacheslav Alexandrovich, 3,975,911.
Koeneker, William V., to UMC Industries, Inc. Flood control for beverage vendor. 3,976,225, Cl. 222-108.000.
Kohama, Tokio; Obayashi, Hideki; Hattori, Tadashi; and Nishida, Minoru, to Nippon Soken, Inc. Intake-air amount detecting system for an internal combustion engine. 3,975,951, Cl. 73-116.000.
Kohler, Gunter A.; and Pestel, Gary M., to Minnesota Mining and Manufacturing Company. Multi-organ technetium complexes production and use thereof. 3,976,762, Cl. 424-1.000.
Kohlhepp, Frederick F.: *See—*
Jass, Herman E.; and Kohlhepp, Frederick F., 3,976,223.
Kohne, Volker: *See—*
Wunder, Wolf; Kohne, Volker; Hill, Rosolde; and Leogrande, Antonio, 3,976,474.
Kojima, Kiyoshi: *See—*
Kubo, Takao; Ohtani, Tadao; Kojima, Shigeru; Kato, Nobuyuki; Kojima, Kiyoshi; Sakamoto, Yoichi; Konno, Isago; and Tsukahara, Masaharu, 3,976,519.
Kojima, Shigeru: *See—*
Kubo, Takao; Ohtani, Tadao; Kojima, Shigeru; Kato, Nobuyuki; Kojima, Kiyoshi; Sakamoto, Yoichi; Konno, Isago; and Tsukahara, Masaharu, 3,976,519.
Kolaian, Jack H.; Patterson, John A.; and Ward, Frank K., to Texaco Inc. Novel salts and method of preparation. 3,976,682, Cl. 260-501.110.
Kolody, Daniel I.: *See—*
Gordon, Gary B.; Haag, George A.; Hofland, Jan R.; and Kolody, Daniel I., 3,976,864.
Kompare, John W.; Potts, John C.; and Simpson, James L., to PPG Industries, Inc. Method and apparatus for introducing a protective atmosphere into a glass forming chamber. 3,976,460, Cl. 65-32.000.
Koncher, Tawny R.: *See—*
Jacobsen, Stephen C.; Smith, Homer R.; and Koncher, Tawny R., 3,976,576.
Kondo, Toshihito: *See—*
Shinohara, Hiroshi; Masunaga, Kunihiko; Kondo, Toshihito; and Ishiguro, Kazuhiko, 3,976,034.
Konno, Isago: *See—*
Kubo, Takao; Ohtani, Tadao; Kojima, Shigeru; Kato, Nobuyuki; Kojima, Kiyoshi; Sakamoto, Yoichi; Konno, Isago; and Tsukahara, Masaharu, 3,976,519.
Koo, James Teh-Zen, to Bell Telephone Laboratories, Incorporated. Low power detector circuit. 3,976,895, Cl. 307-235.00F.
Koppijn, Jan Herman. Foamed formed confections. 3,976,803, Cl. 426-572.000.
Korasiak, Wolfgang: *See—*
Gerstenmeier, Jurgen; Korasiak, Wolfgang; Morath, Thomas; and Muller, Hans, 3,976,860.
Korsten, Andreas: *See—*
Wiebke, Gunter; Korsten, Andreas; Benecke, Theodor; and Petersen, Fritz, 3,976,829.
Koshino, Minoru: *See—*
Motegi, Masanori; Uchida, Keiichiro; Koshino, Minoru; Muraoka, Takatoshi; and Nagasawa, Shigeru, 3,976,866.
Kraftwerk Union Aktiengesellschaft: *See—*
Fork, Kurt, 3,976,917.
Schmoch, Otto, 3,976,399.
Krakow, Burton, to Honeywell Inc. Infrared analyzer. 3,976,883, Cl. 250-343.000.
Kraus, Peter B., to Clark Equipment Company. Midplane porting block for an axial piston machine. 3,975,990, Cl. 92-57.000.
Kremers, Frank J.: *See—*
Yodis, Anthony W.; Kremers, Frank J.; and Lintern, Karol K., 3,976,751.
Kreng, Jack K.; and Ghaem-maghami, Sanjar, to General Electric Company. Bias optimized FET mixer for varactor tuner. 3,976,944, Cl. 325-451.000.
Krogsrud, Harald, to Elkem-Spigerverket. Venturi gas scrubbers for smelting furnaces. 3,976,727, Cl. 261-116.000.
Krubsack, Kim R., to Sola Basic Industries, Inc. Refractory roof construction for the heating chamber of an industrial furnace. 3,976,424, Cl. 432-247.000.
Krug, Laurence M., to Jeffreys, George C. Refrigeration means. 3,976,458, Cl. 62-175.000.
Kruishoop, Johan Christiaan Willem, to U.S. Philips Corporation. Method of and apparatus for quantitative analysis. 3,975,947, Cl. 73-61.10R.
Krus, Joseph W. Burglar-proof lock protector. 3,976,318, Cl. 292-346.000.
Kubiak, James J.: *See—*
Hovey, William P.; and Kubiak, James J., 3,976,526.
Kubler, Heinrich. Transducer for a path tracer. 3,976,963, Cl. 335-206.000.
Kubo, Takao; Ohtani, Tadao; Kojima, Shigeru; Kato, Nobuyuki; Kojima, Kiyoshi; Sakamoto, Yoichi; Konno, Isago; and Tsukahara, Masaharu, to Matsushita Electric Industrial Co., Ltd. Machinable anisotropic permanent magnets of Mn-Al-C alloys. 3,976,519, Cl. 148-120.000.
Kubotera, Kikuo; Mizuki, Eiichi; Kawano, Hideo; and Fujiwara, Tadahiro, to Fuji Photo Film Co., Ltd. Photosensitive printing plate. 3,976,487, Cl. 96-33.000.
Kudo, Norihiro; and Ibe, Hiroshi, to Onoda Cement Company, Ltd. Process for inhibiting corrosion of iron or steel placed in cement products. 3,976,494, Cl. 106-14.000.
Kuehl, Donald K., to United Technologies Corporation. Production of improved boron abrasives. 3,976,444, Cl. 51-307.000.
Kunimori, Kametaro: *See—*
Ariyoshi, Junji; Ohnishi, Akira; Toda, Hiromi; Kunimori, Kametaro; and Nakao, Mitsuyoshi, 3,976,824.
Kunststoff GmbH: *See—*
Hettich, Anton; Stellbrink, Udo; and Sundermeier, Gunter, 3,975,791.
Kuntschik, Lawrence F.; and Rigdon, Orville W., to Texaco Inc. Preparation of tertiary amines. 3,976,697, Cl. 260-583.00R.
Kupchan, S. Morris; and Liepa, Andris J., to Research Corporation. Isoquinoline compounds. 3,976,652, Cl. 260-289.00D.
Kupcikevicius, Vytautas; Nausedas, Joseph A.; and Raudys, Vytas A., to Union Carbide Corporation. Product stuffing apparatus and method. 3,975,795, Cl. 17-41.000.
Kurahashi, Suminobu: *See—*
Inouye, Sakae; Kurahashi, Suminobu; Wada, Norio; Kikuchi, Motokazu; Masuda, Kinji; Akiyama, Tsuneharu; and Osaki, Toshiyuki, 3,976,624.
Kurita, Takaji; and Tanaka, Susumu, to Minolta Camera Kabushiki Kaisha. Electrostatic copying machine. 3,976,375, Cl. 355-14.000.
Kuroki, Katuro, to Nippon Steel Corporation. Process for producing grain-oriented electric steel sheets having remarkably improved magnetic flux density. 3,976,518, Cl. 148-113.000.

Kurtz, George D.: *See—*
Kurtz, John C.; Kurtz, Thomas E.; and Kurtz, George D., 3,976,176.

Kurtz, John C.; Kurtz, Thomas E.; and Kurtz, George D. Spiral chute device. 3,976,176, Cl. 193-12.000.

Kurtz, Thomas E.: *See—*
Kurtz, John C.; Kurtz, Thomas E.; and Kurtz, George D., 3,976,176.

Kurtzrock, Roy C.: *See—*
Lacey, James J.; Kurtzrock, Roy C.; and Bienstock, Daniel, 3,976,592.

Kurzydlo, Mieczyslaw: *See—*
Motyczynski, Ryszard; Franaszek, Tadeusz; Kurzydlo, Mieczyslaw; and Polaczek, Jerzy, 3,976,422.

Kussow, Thomas. Stanchion with milking stool attachment. 3,976,273, Cl. 248-221.00R.

Labana, Santokh S.; and Theodore, Ares N., to Ford Motor Company. Powder coating compositions comprising a blend of coreactive polymers - IIA. 3,976,715, Cl. 260-836.000.

Labana, Santokh S.; and Theodore, Ares N., to Ford Motor Company. Powder coating compositions comprising a blend of coreactive polymers - IIB. 3,976,716, Cl. 260-836.000.

Labana, Santokh S.; and Theodore, Ares N., to Ford Motor Company. Powder coating compositions comprising a blend of coreactive polymers - IIC. 3,976,717, Cl. 260-836.000.

Labana, Santokh S.; and Theodore, Ares N., to Ford Motor Company. Powder coating compositions comprising a blend of coreactive polymers - II E. 3,976,718, Cl. 260-836.000.

Labana, Santokh S.; and Theodore, Ares N., to Ford Motor Company. Powder coating compositions comprising a blend of coreactive polymers - II D. 3,976,719, Cl. 260-836.000.

LaBarber, Joseph A., to Nebraska Technical Equipment Company. System for dressing poultry, animals and the like. 3,975,796, Cl. 17-45.000.

Laby, Jordan M., to American Shower Door Co., Inc. Magnetic door latch. 3,976,316, Cl. 292-251.500.

Lacey, James J.; Kurtzrock, Roy C.; and Bienstock, Daniel, to United States of America, Energy Research and Development Administration. Production of MHD fluid. 3,976,592, Cl. 252-372.000.

Lacher, Thomas F., Jr.; Grob, Russel W.; and Gardner, William J., to Caterpillar Tractor Co. Engine power output measuring instrument. 3,975,952, Cl. 73-117.300.

Laig-Horstebrock, Helmut: *See—*
Winsel, August; and Laig-Horstebrock, Helmut, 3,976,510.

Lalk, Robert H.: *See—*
Thomas, Mary R.; Lalk, Robert H.; Evani, Syamalarao; and Schmidt, Donald L., 3,976,822.

Lamb Industries, Inc.: *See—*
Harper, Roland George, Jr., 3,976,132.

Lambert, Jack R., to Thermo Electron Corporation. Sterile bottle closure. 3,976,216, Cl. 215-307.000.

Lamberti, Vincent, to Lever Brothers Company. Sulfosuccinate derivatives as detergent builders. 3,976,642, Cl. 260-247.10E.

Lampadarios, George V., to Atlantic Richfield Company. Apparatus for catalytic conversion. 3,976,433, Cl. 23-288.00S.

Land, Edwin H., to Polaroid Corporation. Diffusion transfer color products and processes with substituted halide silver halide emulsions. 3,976,486, Cl. 96-3.000.

Landau, Michael B., to United Technologies Corporation. Pressurized fuel cell power plant with air bypass. 3,976,506, Cl. 136-86.00R.

Landau, Pierre. Apparatus for effecting a simultaneous multiple tomography. 3,976,886, Cl. 250-445.00T.

Landquist, Justus Kenneth: *See—*
Coles, Gerald Christopher; and Landquist, Justus Kenneth, 3,976,784.

Landucci, Louis; McKay, Donald Roderick; and Parker, Ernest George, to Cominco Ltd. Treatment of zinc plant residue. 3,976,743, Cl. 423-101.000.

Lane, Lawrence J., to General Electric Company. Voltage synthesization. 3,976,868, Cl. 235-184.000.

Lang, Erich, to Evolution SA. Belt-type thread-supply apparatus. 3,976,261, Cl. 242-128.000.

Lang, Paul Wentworth. 360° Viewing system. 3,976,837, Cl. 178-791.000.

Lange, Gerhard; and Falk, Detlef, to U.S. Philips Corporation. Image tube incorporating a brightness-dependent power supply. 3,976,874, Cl. 250-213.0VT.

Langguth, Arthur F., to United States of America, Navy. Permanent attachment for suction cups. 3,976,274, Cl. 248-363.000.

Lankheet, Jay A. Pool sidewall to floor connection. 3,975,782, Cl. 4-172.000.

Lannom Manufacturing Company, Inc.: *See—*
Heald, Jesse H., Jr., 3,976,295.

Lapatukhin, Veniamin Semenovich: *See—*
Andreeva, Viktoria Ivanovna; Popova, Alexandra Ljudovikovna; and Lapatukhin, Veniamin Semenovich, 3,976,523.

Lapeyre, Pierre A. Floating dry dock with buoyancy controlled air injection and venting system. 3,976,022, Cl. 114-45.000.

Lapidot, Abraham. Laminar middle ear vent tube assembly. 3,976,081, Cl. 128-350.00R.

Larkin, Sam. Pressure gauge. 3,975,959, Cl. 73-419.000.

Larner, Douglas Stanley; Thillainayagam, Velauthar Kopalapillai; Blackmore, Ronald William; and Hill, Barry Michael Ernest, to Plessey Handel und Investments A.G. Supervisory systems for telecommunication line transmission system. 3,976,835, Cl. 178-70.00R.

Larner, Ronald W.: *See—*
Smith, Alan; and Larner, Ronald W., 3,976,546.

Larsen, Donald W., to W. R. Grace & Co. Curable polyene-polythiol compounds and methods for preparation and curing. 3,976,553, Cl. 204-159.220.

Larson, Dale Leonard Milton, to Candaian Hurricane Equipment Ltd. Portable fan housing. 3,976,393, Cl. 415-119.000.

Larson, Jay Michael, to International Nickel Company, Inc., The. Method of making prealloyed thermoplastic powder and consolidated article. 3,976,482, Cl. 75-211.000.

Larsson, Bo Lennart Henning, to Sunds Aktiebolag. Pulp bale press for forming a bale. 3,976,003, Cl. 100-295.000.

Larsson, Gosta; and Nystrom, Kjell Signar, to Pitea Maskin Industri Nystrom & Larsson AB. Cutting tool. 3,976,271, Cl. 144-241.000.

Lateur, Michel J. Vehicle with removable traction apparatus. 3,976,153, Cl. 180-9.20C.

Lauffenburger, Robert F.; and Waszkiewicz, Edmund H., to Waszkiewicz, Edmund H. Lauffen safety locking device for a coupling. 3,976,313, Cl. 285-84.000.

Laurel Bank Machine Co., Ltd.: *See—*
Yoshida, Minoru, 3,976,292.

Laureta, Laurie, to Raymond Lee Organization, Inc., The, a part interest. Bowling pocket pool game. 3,976,293, Cl. 273-2.000.

Lavenu, Jean Claude: *See—*
Dubois, Jean Claude; Zann, Annie; and Lavenu, Jean Claude, 3,976,591.

Lavery, Lawrence P., to Xerox Corporation. Amplifier back-ground control apparatus for use in a document scanning system. 3,976,833, Cl. 178-7.600.

Lawrence Peska Associates, Inc.: *See—*
Cummings, Kenneth R., 3,976,162.

Lawrence, Philip E.; and Plesinger, Boris M. Golf club head apparatus. 3,976,299, Cl. 273-171.000.

Le Nickel: *See—*
Toussaint, Henry, 3,976,760.

Leathers, Joel M., to Dow Chemical Company, The. Apparatus for gusseting continuous lengths of tubular material. 3,976,418, Cl. 425-388.000.

Lebailly, Jacques; and Diguet, Daniel, to U.S. Philips Corporation. Electroluminescent device and method of manufacturing same. 3,977,016, Cl. 357-17.000.

Lederer, Edgar: *See—*
Adam, Arlette; Berger, Frank; Chedid, Louis; Lederer, Edgar; Petit, Jean-Francois; and Ciorbaru, Rita, 3,976,544.

Lederle, Henry F.: *See—*
Scott, Robert N.; Lederle, Henry F.; Milnes, Frank J.; and Raymond, Maurice A., 3,976,675.

Lee, Brian William. Orthodontic brackets. 3,975,824, Cl. 32-14.00A.

Lee, Eugene T.; and Box, Leonard J. Apparatus for sediment control in oil burner installations. 3,976,421, Cl. 431-29.000.

Lee, Gim F., Jr., to General Electric Company. High impact strength thermoplastic compositions. 3,976,725, Cl. 260-892.000.

Lee, Mary Ellen: *See—*
Sweeney, Doris; and Lee, Mary Ellen, 3,976,807.

Lee, Richard Martin; and Sach, George Sidney, to Smith Kline & French Laboratories, Inc. Salicylamides and compositions thereof. 3,976,777, Cl. 424-263.000.

Lee, Tzuo-Chang: *See—*
Braitberg, Michael F.; and Lee, Tzuo-Chang, 3,976,354.

Leffler, Mary W., Administratrix: *See—*
Leffler, William A., Jr, deceased; and Leffler, Mary W., Administratrix, 3,976,017.

Leffler, William A., Jr, deceased; and by Leffler, Mary W., Administratrix. Leguminous plant inoculation process and apparatus. 3,976,017, Cl. 111-1.000.

Le Floch, Albert; and Stephan, Guy, to Agence Nationale de Valorisation de la Recherche (ANVAR). Method of frequency-stabilization of a laser and a laser for carrying out said method. 3,976,957, Cl. 331-94.50S.

Lehle, Erhard: *See—*
Bernardi, Herbert; Lehle, Erhard; Geier, Joseph; Von Aschwege, Gerd; and Haberstroh, Markus, 3,976,291.

Lehmann, Adolf, to Daimler-Benz Aktiengesellschaft. Motor vehicle with foldable top. 3,976,324, Cl. 296-107.000.

Leifer, Leslie, to of Michigan Technological University, Board of Control. Thermal energy storage material. 3,976,584, Cl. 252-77.000.

Leimgruber, Willy: *See—*
Batcho, Andrew David; and Leimgruber, Willy, 3,976,639.

Leinert, Herbert; Popelak, Alfred; Stach, Kurt; Bartsch, Wolfgang; and Dietmann, Karl, to Boehringer Mannheim G.m.b.H. 1,2,3,4-Tetrahydro-carbazole compounds and β-adrenergic compositions. 3,976,779, Cl. 424-274.000.

Leir, Charles M.: *See—*
Gerster, John F.; and Leir, Charles M., 3,976,651.

Leistner, Werner; and Sergl, Josef, to Siemens Aktiengesellschaft. Transposed bar for electric machines. 3,976,904, Cl. 310-213.000.

Leja, Ilmars: *See—*
Perkins, John F., Jr.; and Leja, Ilmars, 3,976,894.

Lemak, Nicolas S.: *See—*
Porter, Marion G.; Patterson, Garvin Wesley; Shelly, William A.; and Lemak, Nicolas S., 3,976,977.

Leogrande, Antonio: *See—*
Wunder, Wolf; Kohne, Volker; Hill, Rosolde; and Leogrande, Antonio, 3,976,474.

Les Fabriques d'Assortiments Reunies: *See—*
Tuetey, Paul Albert, 3,975,962.

Lever Brothers Company: *See—*
Lamberti, Vincent, 3,976,642.
Levin, Norman A., to Johnson & Johnson. Water soluble lubricant for tabletting compositions. 3,976,601, Cl. 252-550.000.
Levy, Boris, to Polaroid Corporation. Silver halide photographic products with semiconductor sensitizers. 3,976,489, Cl. 96-76.00R.
Lewis, Adolph L., to United States of America, Navy. Fiber optic grinding and polishing tool. 3,975,865, Cl. 51-170.00T.
Lewis, Irwin Charles; McHenry, Edgar Ronald; and Singer, Leonard Sidney, to Union Carbide Corporation. Process for producing carbon fibers from mesophase pitch. 3,976,729, Cl. 264-29.700.
Leybold-Heraeus GmbH & Co. KG: *See—*
Redel, Karl Georg, 3,976,908.
Leyendecker, Ralf; and Heinke, Gunter, to Robert Bosch G.m.b.H. Method and apparatus for reducing fretting wear between relatively moving parts. 3,976,342, Cl. 308-237.00R.
Liebsch, Dietrich: *See—*
Wagner, Kuno; Eimer, Johannes; Zirner, Joachim; Raab, Rainer; and Liebsch, Dietrich, 3,976,622.
Liepa, Andris J.: *See—*
Kupchan, S. Morris; and Liepa, Andris J., 3,976,652.
Ligensa, Karl Heinz: *See—*
Wirtz, Egon; and Ligensa, Karl Heinz, 3,976,327.
Liggett & Myers, Incorporated: *See—*
Hall, Floyd Vameda, 3,976,085.
Lillibridge, Christopher B.; and Lotring, Alfred H. Boot scraper for skiis. 3,976,303, Cl. 280-11.37E.
Lillibridge, Christopher B.; and Lotring, Alfred H. Ski boot scraper. 3,976,304, Cl. 280-11.37E.
Lin Eng Corporation: *See—*
Eng, Joseph W.; and Lin, Stanley C. F., 3,976,448.
Lin, Stanley C. F.: *See—*
Eng, Joseph W.; and Lin, Stanley C. F., 3,976,448.
Lincoln Manufacturing Company, Inc.: *See—*
Clymer, Joseph D., deceased, 3,975,887.
Lindberg, Ulf Hendrik Anders; and Akerman, Sven Bengt Arvid, to Astra Lakemedel Aktiebolag. Glycylglycine amide preparations and method of use antiarrhythmic. 3,976,771, Cl. 424-177.000.
Linde Aktiengesellschaft: *See—*
Puschel, Siegfried; and Turkowski, Jan, 3,976,927.
Lindemann, Harley Burke; and Goodell, John Boyden. Optical air lens system. 3,976,364, Cl. 350-179.000.
Linden-Alimak AB: *See—*
Granholm, Sven; and Meijer, Borje, 3,976,149.
Linder, Rolf. Method and an electrically heated device for producing molten metal from powders or lumps of metal oxides. 3,976,472, Cl. 75-10.00R.
Lindquist, Robert D.: *See—*
Paris, Wayne H.; Wolfe, Ronald C.; Fay, Terrence P.; and Lindquist, Robert D., 3,976,736.
Line, Lloyd E., Jr.: *See—*
Bennett, Richard H.; Brockington, James W.; and Line, Lloyd E., Jr., 3,976,759.
Lingl Corporation: *See—*
Lingl, Hans, 3,976,417.
Lingl, Hans, to Lingl Corporation. Apparatus for the production of ceramic plates with ornamental shapes. 3,976,417, Cl. 425-307.000.
Link, John, to Petrolite Corporation. Process for quantitative analysis. 3,976,428, Cl. 23-230.00R.
Link, John T.: *See—*
Schalow, Rudolph D.; and Link, John T., 3,976,985.
Lins, Werner, to ALKEM GmbH. Process for the production of ^{233}Pu $^{16}O_2$. 3,976,748, Cl. 423-251.000.
Lintern, Karol K.: *See—*
Yodis, Anthony W.; Kremers, Frank J.; and Lintern, Karol K., 3,976,751.
Liptak, Gabor; and Schuler, Roland, to BBC Brown Boveri & Company Limited. Winding slot closure for rotary electric machines. 3,976,901, Cl. 310-214.000.
Littauer, Ernest L.: *See—*
Tsai, Keh Chi; and Littauer, Ernest L., 3,976,509.
Little, Little J.: *See—*
Hunter, Joe S.; Bailey, Escar L.; and Little, Little J., 3,975,961.
Litton Fastening Systems: *See—*
Reynolds, Richard L., 3,975,788.
Litton Systems, Inc.: *See—*
Shattuck, Ronald Corroalles, 3,976,906.
Liu, Robert Chung-Huan: *See—*
Hughes, John Lawrence; Liu, Robert Chung-Huan; Enkoji, Takashi; and Bastian, James Winslow, 3,976,787.
Lockheed Missiles & Space Company, Inc.: *See—*
Tsai, Keh Chi; and Littauer, Ernest L., 3,976,509.
Loder, Wallace R., Jr.; Fay, Philip S.; and Veatch, Franklin, to Standard Oil Company. Non-leaded gasoline having improved anti-knock quality. 3,976,439, Cl. 44-68.000.
Loder, Wallace R., Jr.; Fay, Philip S.; and Veatch, Franklin, to Standard Oil Company. Non-leaded gasoline having improved anti-knock quality. 3,976,440, Cl. 44-68.000.
Loev, Bernard: *See—*
Berkoff, Charles E.; Hill, David T.; and Loev, Bernard, 3,976,633.
Logsdon, Hillard Glenn, to Aeronca, Inc. Adjustable air volume regulator having thermal motor actuator for effecting adjustment. 3,976,244, Cl. 236-49.000.
Lohmeyer, Hartmut. Light conductor. 3,976,357, Cl. 350-96.00R.
Lohse, Friedrich; Rembold, Heinz; Baumann, Dieter; and Munk, Kurt, to Ciba-Geigy Corporation. Polysiloxane compounds containing hydroxyl groups. 3,976,676, Cl. 260-448.80R.
Lonardo, Robert. Therapeutic leg and foot device. 3,976,059, Cl. 128-80.00E.
Longbottom, John Douglas, to RCA Corporation. Overbed table with locking mechanism. 3,976,016, Cl. 108-144.000.
Longsderff, Richard William; and Kaiser, Donald Bernard, to RCA Corporation. Laser device and a method of fabrication. 3,976,956, Cl. 331-94.50D.
Lopacki, Edwin Francis, to B. F. Goodrich Company, The. Centering tool. 3,975,830, Cl. 33-191.000.
Lorang, Malcolm M.: *See—*
Cipher, John A.; and Lorang, Malcolm M., 3,976,943.
Lord Corporation: *See—*
Grumblatt, Victor J., 3,976,326.
L'Oreal: *See—*
Kalopissis, Gregoire, 3,976,781.
Loredo, Adolfo Arias. Combined cigarette pack and disposable lighter. 3,976,194, Cl. 206-87.000.
Lotring, Alfred H.: *See—*
Lillibridge, Christopher B.; and Lotring, Alfred H., 3,976,303.
Lillibridge, Christopher B.; and Lotring, Alfred H., 3,976,304.
Lowe, James N.; and Gregory, Earl, to ISG International Incorporated. Building construction. 3,976,741, Cl. 264-256.000.
Lucas Electrical Company Limited, The: *See—*
Cotton, Herbert John Thomas, 3,976,903.
Lucas Industries Limited: *See—*
Spencer, Byron Arthur Thomas, 3,976,173.
Ludwig-Ofag-Indugas Industrieofenanlagen GmbH: *See—*
Schmidt, Theodor, 3,976,423.
Lukes, James J.; Beckers, Norman L.; and Borror, Jack A., to Diamond Shamrock Corporation. Prevention of hydrochlorination. 3,976,705, Cl. 260-654.00H.
Lundquist, Ingemar H., to Origo, Inc. Drug dispenser for use with intravenous feeding pump. 3,976,068, Cl. 128-214.00R.
Lundquist, Ingemar H., to Origo, Inc. Intravenous delivery pump. 3,976,402, Cl. 417-566.000.
Lunsford, Leslie E.; and Simmons, Clyde A. Apparatus for dying yarn. 3,975,930, Cl. 68-189.000.
Lunsford, Leslie E.; and Simmons, Clyde A. Method of dyeing yarn. 3,976,426, Cl. 8-149.000.
Luth, Detlef G. H.: *See—*
Steenken, Heinz W. L.; and Luth, Detlef G. H., 3,975,841.
M & B Metal Products Company: *See—*
Brekle, Oliver R., 3,976,815.
Maat, Jan Philippus: *See—*
Buchner, Robert Bertold; and Maat, Jan Philippus, 3,976,843.
Mabus, Richard C. Needlepoint and crewel-embroidery stitch remover. 3,975,822, Cl. 30-294.000.
MacElvain, Ford M.: *See—*
MacElvain, Robert C.; and MacElvain, Ford M., 3,976,567.
MacElvain, Robert C.; and MacElvain, Ford M. Material concentrator. 3,976,567, Cl. 209-430.000.
MacGregor, Paul T.: *See—*
Karger, Eva R.; and MacGregor, Paul T., 3,976,662.
Macleish, William T., to Polaroid Corporation. Removable antiblocking top coat. 3,976,490, Cl. 96-84.00R.
Madeira, John W.; and Merklen, Kenneth E., to Gulf & Western Industries, Inc. Breakerless distributor with substitutional interrupter array. 3,976,044, Cl. 123-148.00F.
Magherini, Dino. Electrical plug with replaceable fuses. 3,976,967, Cl. 337-211.000.
Maier, Volker Elmar: *See—*
Hayward, Malcolm Edwin; and Maier, Volker Elmar, 3,976,629.
Major, Emery, to Altex Scientific, Inc. Gradient pump apparatus. 3,976,400, Cl. 417-248.000.
Makino, Takayuki; and Toriyama, Haruhiko, to Toyota Jidosha Kogyo Kabushiki Kaisha. Method of measuring axial force on a body utilizing two vibration modes of ultrasonic waves. 3,975,948, Cl. 73-67.200.
Maldonado, Damian G. Game table. 3,976,294, Cl. 273-3.00A.
Malloy, Paul L.: *See—*
Salvesen, Robert H.; Malloy, Paul L.; Bartley, Erle E.; and Meyer, RoNel M., 3,976,766.
Marantette, Ruth B.: *See—*
Marantette, William F.; and Marantette, Ruth B., 3,976,386.
Marantette, William F.; and Marantette, Ruth B. Drill head guiding control for multiple drills. 3,976,386, Cl. 408-43.000.
Marathon Oil Company: *See—*
Douglas, Larry J.; and Wenger, Charles B., 3,976,582.
Marchi, Marcello: *See—*
Bottaccio, Giorgio; Chiusoli, Gian Paolo; and Marchi, Marcello, 3,976,677.
Marconi, Walter: *See—*
Palladino, Nicola; Mazzei, Marcello; Bacchin, Paolo; and Marconi, Walter, 3,976,621.
Marcote, Roland; Eisenberg, Steve; Chand, Ramesh; and Haase, Herman. Gas sample preparation system and method. 3,976,450, Cl. 55-158.000.
Mardla, Ilmar: *See—*
Jysky, Goran; Mardla, Ilmar; and Ericsson, Bjorn, 3,975,831.
Margot, Jean: *See—*
Tuffet, Pierre Edmond; Cuq, Bernard Paul; and Margot, Jean, 3,976,970.

Marinaccio, Mario: *See—*
Baump, Paul A.; and Marinaccio, Mario, 3,975,861.
Marine Construction & Design Co.: *See—*
Grimes, Eldon L.; and Bullock, Kenneth W., 3,975,797.
Marine Consultants Pty., Ltd.: *See—*
Whitaker, Charles T., 3,975,784.
Marino, Anthony V.: *See—*
Moudry, George M.; Moudry, Nancy Lee; Casiello, Nicholas F.; and Marino, Anthony V., 3,976,234.
Marion Power Shovel Company, Inc.: *See—*
Baron, George B.; and Padrutt, Paul W., 3,976,211.
Mark Products, Inc.: *See—*
Hopfe. Dieter H., 3,976,351.
Markland, Svend Aage, to Atomenergikommissionen. Process for the recovery of tantalum and/or niobium from acid solutions thereof. 3,976,475, Cl. 75-101.0BE.
Marrie, Paul, to S.A.R.L. "ETUD". Pancake making machine. 3,975,998, Cl. 99-423.000.
Marston Radiators Limited: *See—*
Johnson, Martin Stanley, 3,976,121.
Martin, Charles E.; Requa, Stanley C., deceased; and by Muir, William, to Recognition Equipment Incorporated. Horizontal scan vertical simulation character reading. 3,976,973, Cl. 340-146.30F.
Martin, Hans. Ski boot. 3,975,838, Cl. 36-121.000.
Martin, Richard E.; and Gildone, Anthony M., to GMF Inc. Carbonator and dispenser for carbonated liquid or the like. 3,976,221, Cl. 222-61.000.
Martin, Robert M., to United States of America, Environmental Protection Agency. In-stack filter cell. 3,976,457, Cl. 55-270.000.
Maschinenfabrik Fahr Aktiengesellschaft: *See—*
Hellkuhl, Ludger, 3,975,892.
Maschinenfabrik Zeil J. Kruckels KG: *See—*
Ruscher, Markus, 3,976,258.
Mashimo, Yukio, to Canon Kabushiki Kaisha. Automatic flash device. 3,976,913, Cl. 315-241.00P.
Mason, Irving: *See—*
Barclay, Doltie W., 3,976,057.
Mason, William C. W.: *See—*
Tilby, Sydney Edward; Mason, William C. W.; and Hodge, Donald William, 3,976,498.
Massey-Ferguson Inc.: *See—*
Elfes, Lee Eugene; and Beckerman, Joseph William, 3,975,970.
Van Dest, Jean Claude, 3,976,174.
Massey-Ferguson Industries Limited: *See—*
Weber, Wilbert D., 3,976,084.
Masson Scott Thrissell Engineering Limited: *See—*
Bossons, Walter Howard, 3,976,237.
Masterson, James A. Removable case for lug locking device and assembly thereof. 3,975,935, Cl. 70-232.000.
Masuda, Kinji: *See—*
Inouye, Sakae; Kurahashi, Suminobu; Wada, Norio; Kikuchi, Motokazu; Masuda, Kinji; Akiyama, Tsuneharu; and Osaki, Toshiyuki, 3,976,624.
Masunaga, Kunihiko: *See—*
Shinohara, Hiroshi; Masunaga, Kunihiko; Kondo, Toshihito; and Ishiguro, Kazuhiko, 3,976,034.
Maszle, George J.: *See—*
Brunelle, Joseph A.; Maszle, George J.; and Scudder, Thomas J., 3,976,880.
Matrisian, Robert Michael, to Du Pont de Nemours, E. I., and Company. Apparatus for applying contacts. 3,976,240, Cl. 228-5.100.
Matsuda, Motonobu, to Minolta Camera Kabushiki Kaisha. Light measuring apparatus. 3,977,011, Cl. 354-24.000.
Matsuda, Shimpei: *See—*
Nakajima, Fumito; Tekeuchi, Masato; Matsuda, Shimpei; Uno, Shigeo; Mori, Toshikatsu; Watanabe, Yoshihisa; and Imanari, Makoto, 3,976,745.
Matsuda, Yoshitane: *See—*
Kamimura, Haruo; Yamashita, Yukio; Nakai, Toshitugu; Wadano, Katsumi; Amada, Kozo; and Matsuda, Yoshitane, 3,975,937.
Matsukura, Kameo; Watanabe, Kunio; Hashimoto, Yoshio; Nakayama, Masatoki; Nakasugi, Hajime; and Takeda, Tetuo, to Nippon Steel Corporation. Method for producing a high toughness and high tensil steel. 3,976,514, Cl. 148-12.00F.
Matsumoto, Takeshi: *See—*
Kaji, Hidehiko; Matsumoto, Takeshi; Sugi, Norio; Ikenaga, Atsuo; Iwata, Shoichi; and Tomikawa, Masami, 3,976,612.
Matsumura, Kenichi: *See—*
Hinohara, Kango; Nishikawa, Makoto; Yokomoto, Noriaki; and Matsumura, Kenichi, 3,976,974.
Matsunaga, Hiroomi; Tsuji, Kozo; and Saito, Teruo, to Sumitomo Chemical Company, Limited; and Hayashibara Biochemical Laboratories, Incorporated. Foamed plastics of resin compositions comprising pullulan type resins and thermoplastic resins and process for producing the same. 3,976,605, Cl. 260-2.5HA.
Matsushita Electric Industrial Co., Ltd.: *See—*
Ishikawa, Kazuo; Irie, Yoshio; and Mifune, Hideo, 3,976,854.
Kubo, Takao; Ohtani, Tadao; Kojima, Shigeru; Kato, Nobuyuki; Kojima, Kiyoshi; Sakamoto, Yoichi; Konno, Isago; and Tsukahara, Masaharu, 3,976,519.
Mori, Kunihito; Kobayashi, Akira; Kishimoto, Yoshinobu; Ohmichi, Yukinobu; and Nakamura, Masatatsu, 3,975,832.
Sekido, Satoshi; Ohhira, Tsukasa; Ikeda, Yutaka; and Yokoyama, Takao, 3,976,502.
Matsushita, Takeshi; and Kawana, Yoshiyuki, to Sony Corporation. Semiconductor integrated circuit. 3,977,019, Cl. 357-48.000.
Matsuura, Masao: *See—*
Noguchi, Tadamasa; Matsuura, Masao; and Ehata, Senzou, 3,976,023.
Matthews, Michael Robert, to Post Office, The. Optical communications systems. 3,976,355, Cl. 350-96.00C.
Matthews, Peter Charles; and Beech, Brian Herbert, to Plessey Handel und Investments A.G. Method and apparatus for detecting timber defects. 3,976,384, Cl. 356-200.000.
Mattson, Glenn Arvid: *See—*
Haslau, Horst Eugen; and Mattson, Glenn Arvid, 3,976,256.
Mattson, Rodney A.: *See—*
Brunnett, Carl J.; Cox, Jerome R., Jr.; Snyder, Donald L.; and Mattson, Rodney A., 3,976,885.
Maurer, Herman J.; and Baker, Donald C., to J. I. Case Company. Shock absorber arrangement for material handling vehicle. 3,976,156, Cl. 180-41.000.
Maus, Leo Donald; and Barton, Charles Emory, to Offshore Company, The. Method and apparatus for determining onboard a heaving vessel the flow rate of drilling fluid flowing out of a wellhole and into a telescoping marine riser connecting between the wellhouse and the vessel. 3,976,148, Cl. 175-7.000.
Maximovich, Boleslav Ivanovich: *See—*
Dudko, Daniil Andreevich; Samsonov, Grigory Valentinovich; Maximovich, Boleslav Ivanovich; Zelenin, Vitaly Ivanovich; Klimanov, Alexandr Sergeevich; Potseluiko, Vladimir Nikolaevich; Trunov, Gennady Vasilievich; and Sleptsov, Vasily Mikhailovich, 3,976,481.
May & Baker Limited: *See—*
Sharp, Brian William; Warburton, Dennis; Williams, Raymond Barry; and Wooldridge, Kenneth Robert Harry, 3,976,786.
Mayfield, Glenn A., to Esterline Corporation. Watt/watt hour transducer having current signals and a modulator therefor. 3,976,942, Cl. 324-142.000.
Mazzei, Marcello: *See—*
Palladino, Nicola; Mazzei, Marcello; Bacchin, Paolo; and Marconi, Walter, 3,976,621.
McAleer, William J.; Spier, Raymond E.; and Schlabach, Abner J., to Merck & Co., Inc. Cell and vaccine production. 3,976,547, Cl. 195-127.000.
McBurnett, James R., to Tyrone Hydraulics, Inc. Engine sensor hydraulic control system. 3,975,909, Cl. 60-421.000.
McCann, Mary Conlin; Plummer, William T.; and Walworth, Vivian K., to Polaroid Corporation. Special optical element for camera to microscope adaptor. 3,976,368, Cl. 350-286.000.
McCardell, Peter D.; and Heckman, Paul J., Jr., to United States of America, Navy. Alpha meter attachment for underwater optical systems. 3,976,369, Cl. 350-319.000.
McCartney, James S. Skin protective device. 3,976,066, Cl. 128-153.000.
McCauley, Michael J.; and Shaner, Richard L., to General Electric Company. Air conditioner damper control. 3,975,920, Cl. 62-262.000.
McCleary, Clifton, Jr.: *See—*
Bay, Eugene H., 3,976,438.
McConnell, Robert G., to Honeywell Inc. Series SCR gate hold-on circuit. 3,976,914, Cl. 315-241.00P.
McConnell, Robert G., to Honeywell Inc. Gate protection circuit for electronic flash apparatus. 3,976,915, Cl. 315-241.00P.
McCray, Arthur W. Method and apparatus for removing contaminants from the surface of a body of water. 3,976,570, Cl. 210-30.00A.
McGraw-Edison Company: *See—*
Neidhardt, Graham B., 3,976,122.
McGregor, Stanley D.; and Senkbeil, Herman O., to Dow Chemical Company, The. Method for preparing 2,5-dihalopyrazines. 3,976,644, Cl. 260-250.00B.
McHenry, Edgar Ronald: *See—*
Lewis, Irwin Charles; McHenry, Edgar Ronald; and Singer, Leonard Sidney, 3,976,729.
McIntosh, Harold A.; Randolph, Hollis L.; and Hull, Bradford N., to Robertshaw Controls Company. Electric sequencer and electric heating system. 3,976,966, Cl. 337-104.000.
McKay, Donald Roderick: *See—*
Landucci, Louis; McKay, Donald Roderick; and Parker, Ernest George, 3,976,743.
McKelvie, James: *See—*
Walker, Colin Alexander; and McKelvie, James, 3,976,381.
McKeown, James Edward, to Trimarc Corporation. Telescopic spin/fly combination fishing rod. 3,975,855, Cl. 43-23.000.
McLaughlin, James Hugh, to Center for New Product Development. Detergents providing faster drying of cleansed substrates. 3,976,588, Cl. 252-117.000.
McLean, Archibald Joseph. Methods of and apparatus for simulating ultrasonic pulse echoes. 3,975,939, Cl. 73-1.0DV.
Mc Murray, Paul L. Free standing shelf unit. 3,976,015, Cl. 108-92.000.
McNeil Corporation: *See—*
Athey, John E., 3,976,409.
Mead Corporation, The: *See—*
Forrer, Homer W., 3,975,884.
Mead Johnson & Company: *See—*
Wu, Yao Hua; and Rayburn, James W., 3,976,776.
Means, Rodney J.: *See—*
Hepworth, Edward C.; and Means, Rodney J., 3,976,949.
Medenus, Bernhard: *See—*
Mettig, Hermann; and Medenus, Bernhard, 3,976,041.
Medicus, Gustav K. Excenter mill. 3,976,253, Cl. 241-167.000.

Mednick, Edward, to Fiber Bond Corporation. Method of making a needled scouring pad. 3,976,525, Cl. 156-72.000.

Meier, Hans; and Wille, Andreas, to Joh. Vaillant, K.G. Device for the separation of gas from a liquid. 3,976,452, Cl. 55-192.000.

Meijer, Borje: *See—*
Granholm, Sven; and Meijer, Borje, 3,976,149.

Meijer, Louis A.: *See—*
van der Molen, Theodorus J.; Meijer, Louis A.; and Joosen, Joos D., 3,976,631.

Meinken, Bernhard: *See—*
Coja, Joachim; von Eckardstein, Karl-Ernest; and Meinken, Bernhard, 3,976,092.

Melco: *See—*
Champan, Louis W., 3,976,849.

Mellard, George K. Ornamental display. 3,975,845, Cl. 40-106.300.

Menasco Manufacturing Company: *See—*
Kendall, Giles A.; and Robertson, James E., 3,976,287.

Mennesson, Bernard Rene, to Societe a Responsabilite Limitee dite SERAM. Automatic sequential control device. 3,976,159, Cl. 180-105.00R.

Merchant, Dhirendra Ranchhoddas; and Hodges, Jimmie Ray, to Pennwalt Corporation. Removal of hydrogen fluoride from gaseous mixture by absorption on alkaline earth metal fluoride. 3,976,447, Cl. 55-71.000.

Merck & Co., Inc.: *See—*
Cragoe, Edward J., Jr.; and Woltersdorf, Otto W., Jr., 3,976,681.
Cragoe, Edward J., Jr.; and Woltersdorf, Otto W., Jr., 3,976,686.
McAleer, William J.; Spier, Raymond E.; and Schlabach, Abner J., 3,976,547.
Reinhold, Donald F., 3,976,689.
Saari, Walfred S., 3,976,782.

Merianos, John J.; and Adams, Phillip, to Millmaster Onyx Corporation. Amino derivatives of tetrasubstituted benzene compounds. 3,976,587, Cl. 252-106.000.

Meridian Corporation: *See—*
Toriello, Danti, 3,976,078.

Merklen, Kenneth E.: *See—*
Madeira, John W.; and Merklen, Kenneth E., 3,976,044.

Mesecar, Roderick S., to United States of America, Navy. Sediment sampling system. 3,975,957, Cl. 73-170.00A.

Messerschmitt-Bolkow-Blohm GmbH: *See—*
Hildebrandt, Jurgen J.; Zahn, Paul; Witt, Alfred Nikolaus; and Jager, Michael, 3,976,060.

Metal Box Limited: *See—*
Waters, Sidney Walter, 3,975,886.

Metco, Inc.: *See—*
Fabel, Arthur J., 3,976,332.

Mettig, Hermann; and Medenus, Bernhard, to Klockner-Humboldt-Deutz Aktiengesellschaft. Supercharged water cooled internal combustion engine. 3,976,041, Cl. 123-119.0CD.

Meurling, Olof Wilhelm: *See—*
Hogberg, Knut Goran; and Meurling, Olof Wilhelm, 3,976,857.

Meuser, Wilfried, to Fried. Krupp Gesellschaft mit beschrankter Haftung. Underwater sound wave direction finding system. 3,976,969, Cl. 340-6.00R.

Meyer, David P.; Ellis, Gordon F.; and El-Moslimany, Mohammad A., to Boeing Company, The. Vertical glide slope control system including complementary filter. 3,976,267, Cl. 244-186.000.

Meyer, H. T., to General Staple Company, Inc. Autotab machine. 3,975,811, Cl. 29-203.00B.

Meyer, John V., to Texas Instruments Incorporated. Process for making conductive polymers. 3,976,600, Cl. 252-511.000.

Meyer, RoNel M.: *See—*
Salvesen, Robert H.; Malloy, Paul L.; Bartley, Erle E.; and Meyer, RoNel M., 3,976,766.

Miavecz, Joseph L.; Spry, Donald J.; and Wojcik, David S., to Owens-Illinois, Inc. Electrical supply system and method for improving the operating characteristics of gaseous discharge display panels. 3,976,912, Cl. 315-169.0TV.

Michalski, Maksymilian, to Berkey Photo, Inc. Illumination system and method and means for operating it. 3,976,911, Cl. 315-101.000.

Michne, William F.: *See—*
Albertson, Noel F.; and Michne, William F., 3,976,653.

Mickeler, Karl; and Schall, Moritz, to Fouquet-Werke Frauz & Planck, Firma. Striping apparatus for circular knitting machines. 3,975,927, Cl. 66-134.000.

Micromeritics Instrument Corporation: *See—*
Ball, Dean M.; Camp, Ronnie W.; Hendrix, Warren P.; and Orr, Clyde, Jr., 3,975,946.

Middleton, Gary Lee, Sr., to Polymir Industries, Inc. Polyurethane pour gun. 3,976,248, Cl. 239-416.100.

Middleton, William Joseph, to Du Pont de Nemours, E. I., and Company. Dialkylaminosulfur trifluorides as fluorinating agents. 3,976,691, Cl. 260-544.00F.

Miersch, Horst K., to Cutler-Hammer, Inc. Compensated traveling wave slotted waveguide feed for cophasal arrays. 3,977,006, Cl. 343-778.000.

Mifune, Hideo: *See—*
Ishikawa, Kazuo; Irie, Yoshio; and Mifune, Hideo, 3,976,854.

Milkovic, Miran, to General Electric Company. Auto-ranging system for an electronic energy meter. 3,976,941, Cl. 324-142.000.

Miller, Calvin L., to Caterpillar Tractor Co. Step assembly for an earth-moving vehicle. 3,976,164, Cl. 182-89.000.

Miller, Charles E.: *See—*
Repik, Albert J.; Miller, Charles E.; and Johnson, Homer R., 3,976,597.

Miller, John M. Trash catching device. 3,976,573, Cl. 210-158.000.

Miller, Lowell G.; Young, Robert C.; and Brugger, Robert M., to United States of America, Energy Research and Development Administration. Fission fragment driven neutron source. 3,976,888, Cl. 250-500.000.

Miller, Ralph L., to Bell Telephone Laboratories, Incorporated. Telephone privacy system. 3,976,839, Cl. 179-1.50M.

Miller, Steven Gary: *See—*
Bidlack, Richard Henry; Egan, Wayne Jay; and Miller, Steven Gary, 3,976,847.

Miller, Vernon J., to Southwire Company. Apparaus for applying a fluid coating to a movable endless casting surface. 3,976,119, Cl. 164-268.000.

Millmaster Onyx Corporation: *See—*
Merianos, John J.; and Adams, Phillip, 3,976,587.

Millward, John David, to Rank Organisation, Limited, The. Circuit for detecting vertical mis-registration in a flying spot scanner. 3,976,832, Cl. 178-6.800.

Milnes, Frank J.: *See—*
Scott, Robert N.; Lederle, Henry F.; Milnes, Frank J.; and Raymond, Maurice A., 3,976,675.

Minck, Robert W.; Weber, Neill; and Chang, Yu-chieh, to Ford Motor Company. Process for recharging secondary batteries. 3,976,503, Cl. 136-6.0FS.

Minnesota Mining and Manufacturing Company: *See—*
Giulie, Joe D.; and Worcester, Leslie E., 3,975,975.
Gobran, Ramsis, 3,976,606.
Kohler, Gunter A.; and Pestel, Gary M., 3,976,762.

Minolta Camera Kabushiki Kaisha: *See—*
Kurita, Takaji; and Tanaka, Susumu, 3,976,375.
Matsuda, Motonobu, 3,977,011.

Minton, Stanley J.: *See—*
Silvern, David H.; and Minton, Stanley J., 3,976,390.

Mirtain, Henri J.; and Mishory, Jonathan, to Uniroyal, S.A.; and Uniroyal Inc. Pneumatic tire. 3,976,115, Cl. 152-361.00R.

Mishory, Jonathan: *See—*
Mirtain, Henri J.; and Mishory, Jonathan, 3,976,115.

Misslin, Raphael Charles: *See—*
Hauri, Rene; and Misslin, Raphael Charles, 3,976,246.

Mita Industrial Company, Ltd.: *See—*
Nihyakumen, Kouzi; Yokoyama, Taizo; Ueda, Yasuo; Kamezawa, Yasutoki; and Aizawa, Tatsuo, 3,976,488.

Mitchell, Edward, to Texaco Inc. Rotary engine and method of operation. 3,976,035, Cl. 123-8.090.

Mitchell, John W., to United States of America, Energy Research and Development Administration. Alloy solution hardening with solute pairs. 3,976,479, Cl. 75-162.000.

Mitchell, Robert S., to Monsanto Company. Methods of scale inhibition. 3,976,589, Cl. 252-180.000.

Mitoff, Stephan P.: *See—*
Powers, Robert W.; Mitoff, Stephan P.; and Szymalak, Edward, 3,976,554.

Mitsubishi Gas Chemical Company, Inc.: *See—*
Suzuki, Takashi; and Naito, Susumu, 3,976,702.

Mitsubishi Jukogyo Kabushiki Kaisha: *See—*
Takahashi, Yasuro; and Yamamoto, Hisao, 3,976,420.

Mitsubishi Petrochemical Company Limited: *See—*
Nakajima, Fumito; Tekeuchi, Masato; Matsuda, Shimpei; Uno, Shigeo; Mori, Toshikatsu; Watanabe, Yoshihisa; and Imanari, Makoto, 3,976,745.

Miyao, Kohei: *See—*
Watanabe, Sumio; Kayano, Masanori; Ishino, Yoshio; and Miyao, Kohei, 3,976,764.

Miyata, Shizuo; Nakao, Yoshihide; Irihara, Koichi; Kawai, Ryoichi; and Nakao, Motokazu, to Sharp Kabushiki Kaisha. Electrophotographical reproduction of a multicolor image. 3,976,372, Cl. 355-4.000.

Mizuki, Eiichi: *See—*
Kubotera, Kikuo; Mizuki, Eiichi; Kawano, Hideo; and Fujiwara, Tadahiro, 3,976,487.

Mlavsky, Abraham I., to Mobil Tyco Solar Energy Corporation. Tubular solar cell devices. 3,976,508, Cl. 136-89.000.

Mobil Oil Corporation: *See—*
Daviditz, John C., 3,976,598.
Herrington, F. John, 3,976,732.
Johnson, David E., 3,976,285.
Rodewald, Paul G., 3,976,714.

Mobil Tyco Solar Energy Corporation: *See—*
Mlavsky, Abraham I., 3,976,508.

Modarelli, Donald W., Jr. Modular building with interlocking panels. 3,975,878, Cl. 52-285.000.

Modern Medical Concepts, Inc.: *See—*
Cohen, Sheldon S., 3,976,195.

Moertel, George B., to Textron, Inc. Slide fastener stringer. 3,975,801, Cl. 24-205.10C.

Moertel, George B., to Textron, Inc. Slider fastener and stringer. 3,975,802, Cl. 24-205.16C.

Monnet, Bernard Leon, to Billion S.A. Injection molding nozzle for three separate materials. 3,976,226, Cl. 222-135.000.

Monsanto Company: *See—*
Herber, John F.; Street, Robert W.; and Richard, William R., Jr., 3,976,585.
Mitchell, Robert S., 3,976,589.
Morgan, Albert W.; and Vanderlinde, William, 3,976,619.

Montanelli, Enea. Reducible volume structure, particularly suitable for baby carriages. 3,976,309, Cl. 280-644.000.

Montedison S.p.A.: *See*—
Bottaccio, Giorgio; Chiusoli, Gian Paolo; and Marchi, Marcello, 3,976,677.
Caporiccio, Gerardo; and Bargigia, Gianangelo, 3,976,603.

Monter, Robert Paul; Hall, Albert Moore; and Cartmell, James Vernon, to NDM Corporation. Electrode and conductor therefor. 3,976,055, Cl. 128-2.06E.

Moody, Roy A.: *See*—
Caveney, Jack E.; Moody, Roy A.; Fulton, Ronald T.; and Rehling, Charles J., 3,976,108.

Moore, Donald G., to Chemetron Corporation. Sensor-detector assembly for microwave oven. 3,976,961, Cl. 335-146.000.

Moore, Thomas A.; Gehman, Earl; and Huddleston, George, to Vega Precision Laboratories, Inc. Airborne target recognition system. 3,976,999, Cl. 343-7.300.

Moore, Troy D.: *See*—
Adams, Anthony L.; and Moore, Troy D., 3,976,329.

Morath, Thomas: *See*—
Gerstenmeier, Jurgen; Korasiak, Wolfgang; Morath, Thomas; and Muller, Hans, 3,976,860.

Morgan, Albert W.; and Vanderlinde, William, to Monsanto Company. Flame retardant polymers containing phosphates. 3,976,619, Cl. 260-45.70P.

Morgulis, Jury Borisovich; Povetkin, German Mitrofanovich; Kaminsky, Valery Naumovich; and Kochetov, Vyacheslav Alexandrovich. Turbocharger. 3,975,911, Cl. 60-602.000.

Mori, Atsuo; Tsuji, Kozo; and Kitamura, Shuji, to Sumitomo Chemical Company, Limited; and Hayashibara Biochemical Laboratories, Incorporated. Resin-coated glass bottles. 3,976,819, Cl. 428-35.000.

Mori, Kunihito; Kobayashi, Akira; Kishimoto, Yoshinobu; Ohmichi, Yukinobu; and Nakamura, Masatatsu, to Matsushita Electric Industrial Co., Ltd. Hot air drying machine. 3,975,832, Cl. 34-53.000.

Mori, Takemitsu, to Nippon Concrete Industries Co. Ltd. Method of inserting tension wires in the process of wire assembling. 3,975,815, Cl. 29-433.000.

Mori, Toshikatsu: *See*—
Nakajima, Fumito; Tekeuchi, Masato; Matsuda, Shimpei; Uno, Shigeo; Mori, Toshikatsu; Watanabe, Yoshihisa; and Imanari, Makoto, 3,976,745.

Mornberg, Gustav, to Palmstiernas Mekaniska Verkstad AB. Microtome. 3,975,977, Cl. 83-707.000.

Morokuma, Tadashi, to Olympus Optical Co., Ltd. Interferometers. 3,976,379, Cl. 356-106.00R.

Morris, Roger E.; and Tucker, Harold, to B. F. Goodrich Company, The. Acrylate rubber vulcanizable compositions. 3,976,610, Cl. 260-23.0TN.

Morris, Roger E., to B.F. Goodrich Company, The. Vulcanizable compositions of carboxyl-containing polymers. 3,976,627, Cl. 526-14.000.

Morton, Paul S.; and Rossio, John H. Attache grill. 3,976,046, Cl. 126-9.00R.

Moser, Kurt; and Weigele, Reinhold, to Develop KG/Dr. Eisbein and Co. Mounting arrangement for component elements of copying machine. 3,976,371, Cl. 355-3.0DD.

Mosher, Peter J.: *See*—
Smith, Richard L.; and Mosher, Peter J., 3,975,953.

Motegi, Masanori; Uchida, Keiichiro; Koshino, Minoru; Muraoka, Takatoshi; and Nagasawa, Shigeru, to Fujitsu Ltd. Addition control system. 3,976,866, Cl. 235-168.000.

Motorola, Inc.: *See*—
Buchanan, John K., 3,976,892.
Hepworth, Edward C.; and Means, Rodney J., 3,976,949.

Motyczynski, Ryszard; Franaszek, Tadeusz; Kurzydlo, Mieczyslaw; and Polaczek, Jerzy, to Przedsiebiorstwo Projektowania i Wyposazania Odlewni "Prodlew". Apparatus for reclamation of resinous moulding mixes. 3,976,422, Cl. 432-58.000.

Moudry, George M.; Moudry, Nancy Lee; Casiello, Nicholas F.; and Marino, Anthony V., to Amphora Enterprises Inc. Portable ski and ski pole carrying apparatus. 3,976,234, Cl. 224-45.00S.

Moudry, Nancy Lee: *See*—
Moudry, George M.; Moudry, Nancy Lee; Casiello, Nicholas F.; and Marino, Anthony V., 3,976,234.

Mountain, Donald C. Pump for abrasive slurries and the like. 3,976,401, Cl. 417-393.000.

Moussie, Michel, to U.S. Philips Corporation. Bipolar programmable read only memory with fusible links. 3,976,983, Cl. 340-173.0SP.

Mrdjenovich, Robert. High temperature cast austenitic exhaust valve. 3,976,476, Cl. 75-128.00A.

Much, Joe. Toy construction fabricating member and assemblage. 3,975,858, Cl. 46-26.000.

Mueller, Charles William: *See*—
Wu, Chung Pao; Douglas, Edward Curtis; and Mueller, Charles William, 3,976,377.

Mueller Hans W.; Sherman, Howard F.; and Shattuck, Richard E., to SCM Corporation. Typing machine repeat key action. 3,976,181, Cl. 197-17.000.

Mueller, Martin, to Owens-Illinois, Inc. Packaging system. 3,976,196, Cl. 206-526.000.

Mueller, Martin: *See*—
Guyot, Volker; Holdinghausen, Paul; and Mueller, Martin, 3,976,947.

Mueller, Rudolf: *See*—
Schmidt, Arno; and Mueller, Rudolf, 3,975,938.

Muhleck, Earl M. Adjustable pedal construction. 3,975,972, Cl. 74-560.000.

Muir, William: *See*—
Martin, Charles E.; Requa, Stanley C., deceased; and Muir, William, 3,976,973.

Mukaida, Yoshito; and Tsuboi, Masayoshi, to Fuji Photo Film Co., Ltd. Method of preparing diffusion transfer image-receiving materials. 3,976,817, Cl. 427-308.000.

Muller, Hans: *See*—
Gerstenmeier, Jurgen; Korasiak, Wolfgang; Morath, Thomas; and Muller, Hans, 3,976,860.

Muller, Hugo Stefan. Slat conveyor. 3,976,192, Cl. 198-195.000.

Muller, Jean-Pierre, to Breveteam S.A. Method and means for covering low plant growths. 3,975,859, Cl. 47-31.000.

Multibrev Anstalt: *See*—
Cobelli, Mario, 3,976,233.

Munchbach, George Ernest: *See*—
Walton, Richard Rhodes; and Munchbach, George Ernest, 3,975,806.

Munk, Kurt: *See*—
Lohse, Friedrich; Rembold, Heinz; Baumann, Dieter; and Munk, Kurt, 3,976,676.

Munns, Robert K. Bicycle wall rack. 3,976,200, Cl. 211-18.000.

Muramoto, Shoichi: *See*—
Yanagisawa, Yuzuru; Ohgoshi, Akio; Yamanaka, Akira; and Muramoto, Shoichi, 3,976,907.

Muraoka, Takatoshi: *See*—
Motegi, Masanori; Uchida, Keiichiro; Koshino, Minoru; Muraoka, Takatoshi; and Nagasawa, Shigeru, 3,976,866.

Muroki, Takumi; and Hayashida, Motoyuki, to Toyo Kogyo Co., Ltd. Rotary piston engines. 3,976,036, Cl. 123-8.090.

Murphree, Burleigh R., to Peabody Dore' Corporation. Expansion joint. 3,976,312, Cl. 285-45.000.

Murphy, Richard J., to Xerox Corporation. Fusing method. 3,976,814, Cl. 427-226.000.

Murray, John R.; Heer, Harvey W.; and Carswell, Larry G., to General Signal Corporation. Control system for railroads. 3,976,272, Cl. 246-5.000.

Myles, Walter E.: *See*—
Eisenberg, Robert M.; and Myles, Walter E., 3,975,834.

Nachtigal, Julius Harvey, to Colgate-Palmolive Company. Antibacterial oral preparations. 3,976,765, Cl. 424-54.000.

Nadella: *See*—
Pitner, Alfred, 3,976,340.

Nadelson, Jeffrey; and Houlihan, William J., to Sandoz, Inc. Substituted 7,12-methano dibenzazocines and 8,13-methano dibenzazonines. 3,976,634, Cl. 260-239.0BB.

Nagarajan, Kuppuswamy; Arya, Vishwa Prakash; and George, Thomas, to Ciba-Geigy Corporation. Imidazoles and processes for their production. 3,976,778, Cl. 424-273.000.

Nagasawa, Shigeru: *See*—
Motegi, Masanori; Uchida, Keiichiro; Koshino, Minoru; Muraoka, Takatoshi; and Nagasawa, Shigeru, 3,976,866.

Naito, Noriaki: *See*—
Nakamura, Shoichi; and Naito, Noriaki, 3,977,023.

Naito, Okito, to Kabushiki Kaisha Suwa Seikosha. Electronic display digital wristwatch. 3,975,897, Cl. 58-23.00R.

Naito, Susumu: *See*—
Suzuki, Takashi; and Naito, Susumu, 3,976,702.

Naka, Hiromitsu. Floor hatch. 3,975,870, Cl. 52-20.000.

Nakagawa, Hirohide: *See*—
Washizuka, Isamu; and Nakagawa, Hirohide, 3,976,994.

Nakagawa, Jihei, to Olympus Optical Co., Ltd. Large-aperture, ultra wide angle photographic lens system. 3,976,365, Cl. 350-214.000.

Nakai, Toshitugu: *See*—
Kamimura, Haruo; Yamashita, Yukio; Nakai, Toshitugu; Wadano, Katsumi; Amada, Kozo; and Matsuda, Yoshitane, 3,975,937.

Nakajima, Chugi, to Ishikawajima-Harima Jukogyo Kabushiki Kaisha. Hydraulic cylinder. 3,975,991, Cl. 92-117.00A.

Nakajima, Fumito; Tekeuchi, Masato; Matsuda, Shimpei; Uno, Shigeo; Mori, Toshikatsu; Watanabe, Yoshihisa; and Imanari, Makoto, to Mitsubishi Petrochemical Company Limited; Hitachi, Ltd.; and Babcock-Hitachi K.K. Process for reducing nitrogen oxides to nitrogen. 3,976,745, Cl. 423-239.000.

Nakamura, Masatatsu: *See*—
Mori, Kunihito; Kobayashi, Akira; Kishimoto, Yoshinobu; Ohmichi, Yukinobu; and Nakamura, Masatatsu, 3,975,832.

Nakamura, Shoichi; and Naito, Noriaki, to Sony Corporation. Tape recorder. 3,977,023, Cl. 360-67.000.

Nakane, Jun, to Bandamatic System Services Kabushiki Kaisha; and Sekisui Jushi Kabushiki Kaisha. Apparatus for producing packing cases. 3,975,994, Cl. 93-51.0HW.

Nakao, Mitsuyoshi: *See*—
Ariyoshi, Junji; Ohnishi, Akira; Toda, Hiromi; Kunimori, Kametaro; and Nakao, Mitsuyoshi, 3,976,824.

Nakao, Motokazu: *See*—
Miyata, Shizuo; Nakao, Yoshihide; Irihara, Koichi; Kawai, Ryoichi; and Nakao, Motokazu, 3,976,372.

Nakao, Yoshihide: *See*—
Miyata, Shizuo; Nakao, Yoshihide; Irihara, Koichi; Kawai, Ryoichi; and Nakao, Motokazu, 3,976,372.

Nakasugi, Hajime: *See*—
Matsukura, Kameo; Watanabe, Kunio; Hashimoto, Yoshio; Nakayama, Masatoki; Nakasugi, Hajime; and Takeda, Tetuo, 3,976,514.

Nakayama, Masatoki: *See—*
Matsukura, Kameo; Watanabe, Kunio; Hashimoto, Yoshio; Nakayama, Masatoki; Nakasugi, Hajime; and Takeda, Tetuo, 3,976,514.
Napflin, Hans. Safety ski binding. 3,976,308, Cl. 280-626.000.
Nara, Takashi; Takasawa, Seigo; Okachi, Ryo; Kawamoto, Isao; Yamamoto, Mitsuyoshi; Sato, Seiji; and Sato, Tomoyasu, to Abbott Laboratories. Fortimicin A. 3,976,768, Cl. 424-118.000.
Narayanan, Venkatachala Lakshmi, to E. R. Squibb & Sons, Inc. 3-Hetero-5-substituted aminophenyloxadiazoles. 3,976,657, Cl. 260-307.00G.
Nariai, Yukitoshi: *See—*
Tanahashi, Kunio; and Nariai, Yukitoshi, 3,976,738.
Natale, Peter E.; and Bennett, Frank C., Jr., to Eastman Kodak Company. Photoconductive cells. 3,976,812, Cl. 427-74.000.
National Association of Hosiery Manufacturers, Inc.: *See—*
Peel, Robert, 3,975,956.
Nault, Harold. Attachment for ground-engaging pads of stabilizers. 3,976,306, Cl. 280-763.000.
Nausedas, Joseph A.: *See—*
Kupcikevicius, Vytautas; Nausedas, Joseph A.; and Raudys, Vytas A., 3,975,795.
Navaltronic A/S: *See—*
Hope, Bjorn R., 3,975,958.
NDM Corporation: *See—*
Monter, Robert Paul; Hall, Albert Moore; and Cartmell, James Vernon, 3,976,055.
Nebraska Technical Equipment Company: *See—*
LaBarber, Joseph A., 3,975,796.
Neel, Eugene Allen, Jr.: *See—*
Colpoys, Patrick Joseph, Jr.; and Neel, Eugene Allen, Jr., 3,976,138.
Neidhardt, Graham B., to McGraw-Edison Company. Combination refrigerator-thawer apparatus. 3,976,122, Cl. 165-27.000.
Neier, Benjamin R., to B/J Manufacturing Co., Inc. Ensilage loader. 3,976,186, Cl. 198-8.000.
Nestoridis, Antony: *See—*
Gambopoulos, Theodor; and Nestoridis, Antony, 3,976,251.
Neurath, A. Robert, to New York Blood Center, The. Purification of hepatitis B surface antigen by chromatography on agarose containing aminoalkyl residues. 3,976,767, Cl. 424-89.000.
New York Blood Center, The: *See—*
Neurath, A. Robert, 3,976,767.
Newberry, John; and Ettie, Allan George Albert Edward, to BICC Limited. Winding wire and other flexible material. 3,976,259, Cl. 242-78.000.
Newman-Howells Associates Limited: *See—*
Howells, Francis Thomas; and Newman, John Maldwyn, 3,976,028.
Newman, John Maldwyn: *See—*
Howells, Francis Thomas; and Newman, John Maldwyn, 3,976,028.
Newnom, Richard S., to Amerace Corporation. Method for making self-locking internally threaded fasteners with ring-like self-locking elements. 3,975,787, Cl. 10-86.00A.
Newson, Melvin M., to United States of America, Energy Research and Development Administration. Prestressed glass, aezoelectric electrical power source. 3,976,898, Cl. 310-8.300.
Newton, St. Elmo, III. Total ankle arthroplasty. 3,975,778, Cl. 3-1.910.
Nichibei Fuji Cycle Co., Ltd.: *See—*
Ogisu, Noriyuki, 3,976,307.
Nicholas, Vincent: *See—*
Fleischhacker, James Earl; Nicholas, Vincent; and Wasserlein, Henry George, Jr., 3,975,812.
Nicolaus, Frank G., to Bally Manufacturing Corporation. Trip lever guard means for reel spinning games. 3,975,963, Cl. 74-17.500.
Niessen, Paul: *See—*
Geiger, Kenneth Daniel; Horvath, Steven Joseph; Niessen, Paul; and Seymour, Theodore Joseph, 3,976,405.
Nihon Densokki Kabushiki Kaisha: *See—*
Nishino, Eizo, 3,976,936.
Nihyakumen, Kouzi; Yokoyama, Taizo; Ueda, Yasuo; Kamezawa, Yasutoki; and Aizawa, Tatsuo, to Mita Industrial Company, Ltd. Treating agent for diazo-type multicolor reproduction. 3,976,488, Cl. 96-49.000.
Niigata Engineering Co., Ltd.: *See—*
Noguchi, Tadamasa; Matsuura, Masao; and Ehata, Senzou, 3,976,023.
Nikonenko, Anatoly Vasilievich: *See—*
Alien, Imant Karlovich; Avdeev, Ivan Ivanovich; Gelfandbein, Yakov Aronovich; Ershov, Boris Nikolaevich; Nikonenko, Anatoly Vasilievich; Popov, Jury Olegovich; Khesin, Arkady Yakovlevich; and Yanson, Boris Albertovich, 3,976,827.
Ninowski, James, Jr. Window assembly. 3,975,881, Cl. 52-498.000.
Nippon Columbia Kabushiki Kaisha: *See—*
Kobayashi, Yoshikazu; and Harada, Masachika, 3,977,021.
Nippon Concrete Industries Co. Ltd.: *See—*
Mori, Takemitsu, 3,975,815.
Nippon Electric Company, Ltd.: *See—*
Iwakawa, Tunekiyo; and Yano, Akira, 3,976,971.
Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha: *See—*
Takida, Hiroshi; and Akamatu, Yoshimi, 3,976,618.
Nippon Kokan Kabushiki Kaisha: *See—*
Kamimura, Haruo; Yamashita, Yukio; Nakai, Toshitugu; Wadano, Katsumi; Amada, Kozo; and Matsuda, Yoshitane, 3,975,937.
Nippon Soken, Inc.: *See—*
Kohama, Tokio; Obayashi, Hideki; Hattori, Tadashi; and Nishida, Minoru, 3,975,951.
Nippon Steel Corporation: *See—*
Katayama, Hiroyuki; and Inatomi, Makoto, 3,976,473.
Kuroki, Katuro, 3,976,518.
Matsukura, Kameo; Watanabe, Kunio; Hashimoto, Yoshio; Nakayama, Masatoki; Nakasugi, Hajime; and Takeda, Tetuo, 3,976,514.
Nippon Zeon Co., Ltd.: *See—*
Akiyama, Shinichi; and Yamamoto, Haruhisa, 3,976,688.
Nishida, Minoru: *See—*
Kohama, Tokio; Obayashi, Hideki; Hattori, Tadashi; and Nishida, Minoru, 3,975,951.
Nishikawa, Makoto: *See—*
Hinohara, Kango; Nishikawa, Makoto; Yokomoto, Noriaki; and Matsumura, Kenichi, 3,976,974.
Nishimura, Izuhiko, to Kabushiki Kaisha Suwa Seikosha. Electronic timepiece. 3,975,898, Cl. 58-23.00R.
Nishino, Eizo, to Nihon Densokki Kabushiki Kaisha. Non-destructive metal inspection apparatus using a sharp-pointed pin and coil for producing eddy currents in the inspected article. 3,976,936, Cl. 324-37.000.
Nissan Motor Co., Ltd.: *See—*
Hyakutake, Yasuhiko; and Andou, Takao, 3,976,398.
Nissin Shokuhin Kaisha, Ltd.: *See—*
Ando, Momofuku, 3,976,795.
NL Industries, Inc.: *See—*
Granquist, William T., 3,976,744.
Noesen, Stanley J.: *See—*
Baldwin, Frederick M.; and Noesen, Stanley J., 3,975,936.
Noguchi, Tadamasa; Matsuura, Masao; and Ehata, Senzou, to Niigata Engineering Co., Ltd. Apparatus for maneuvering a ship. 3,976,023, Cl. 114-144.00E.
Nolan, John James: *See—*
Edwards, Clarence Roy; and Nolan, John James, 3,976,861.
Nordgren, John Lennart, to U.S. Philips Corporation. Arrangement for automatic switching in electric fuses for projectiles. 3,976,012, Cl. 102-70.20R.
Norris, Philip R., to Polaroid Corporation. Follow focus exposure control system with improved uniform trim control. 3,977,014, Cl. 354-196.000.
North American Products Corporation: *See—*
Rowlson, Peter C.; and Schneider, Ronald J., 3,976,112.
Norwalk-Turbo, Inc.: *See—*
Pilarczyk, Karol, 3,976,165.
Noske, Erich; and Grassme, Ulrich, to Siemens Aktiengesellschaft. X-ray diagnostic apparatus. 3,976,889, Cl. 250-510.000.
Nuclear Associates, Inc.: *See—*
Glasser, Herman; and Panetta, Patrick F., 3,976,050.
Nuclear Power Group Limited, The: *See—*
Birch, William; Stuart, Roger Alexander; Facer, Robert Ian; and Durston, John Graham, 3,975,879.
Nudenberg, Walter: *See—*
Rim, Yong S.; and Nudenberg, Walter, 3,976,664.
Nuova San Giorgio S.p.A.: *See—*
Piro, Mario, 3,975,925.
Nystrom, Kjell Signar: *See—*
Larsson, Gosta; and Nystrom, Kjell Signar, 3,976,271.
Obayashi, Hideki: *See—*
Kohama, Tokio; Obayashi, Hideki; Hattori, Tadashi; and Nishida, Minoru, 3,975,951.
O'Brien, James W.: *See—*
Bornhorst, Walter J.; Coleman, Steven J.; and O'Brien, James W., 3,976,080.
O'Brien, Robert L.: *See—*
Karanian, Arthur J.; and O'Brien, Robert L., 3,976,088.
Oda, Singo: *See—*
Katoh, Takashi; Hidaka, Hideo; and Oda, Singo, 3,975,798.
Oda, Tetuzo: *See—*
Adachi, Nokihisa; and Oda, Tetuzo, 3,975,928.
O'Donnell, James M., to Orgonics, Inc. Sterilized organic waste product and process of producing same. 3,976,465, Cl. 71-13.000.
of Michigan Technological University, Board of Control: *See—*
Leifer, Leslie, 3,976,584.
Offshore Company, The: *See—*
Maus, Leo Donald; and Barton, Charles Emory, 3,976,148.
Oganesian, Oganes Vardanovich: *See—*
Volkov, Mstislav Vasilievich; and Oganesian, Oganes Vardanovich, 3,976,061.
Ogawa, Yutaka, to Akebono Brake Industry Co., Ltd. Disc brake. 3,976,169, Cl. 188-73.300.
Ogg, Harold Edward, Jr.: *See—*
Calcaterra, Bernard Jacob; Ogg, Harold Edward, Jr.; and Osborne, James Herschell, 3,975,828.
Ogisu, Noriyuki, to Nichibei Fuji Cycle Co., Ltd. Means for preventing the detachment of the front wheel from a bicycle. 3,976,307, Cl. 280-279.000.
Ohara, Katsunobu: *See—*
Ando, Yujiro; Ohara, Katsunobu; and Tanaka, Keiji, 3,976,484.
Ohgoshi, Akio: *See—*
Yanagisawa, Yuzuru; Ohgoshi, Akio; Yamanaka, Akira; and Muramoto, Shoichi, 3,976,907.
Ohhira, Tsukasa: *See—*
Sekido, Satoshi; Ohhira, Tsukasa; Ikeda, Yutaka; and Yokoyama, Takao, 3,976,502.

Ohmichi, Yukinobu: *See—*
Mori, Kunihito; Kobayashi, Akira; Kishimoto, Yoshinobu; Ohmichi, Yukinobu; and Nakamura, Masatatsu, 3,975,832.
Ohnishi, Akira: *See—*
Ariyoshi, Junji; Ohnishi, Akira; Toda, Hiromi; Kunimori, Kametaro; and Nakao, Mitsuyoshi, 3,976,824.
Ohtani, Tadao: *See—*
Kubo, Takao; Ohtani, Tadao; Kojima, Shigeru; Kato, Nobuyuki; Kojima, Kiyoshi; Sakamoto, Yoichi; Konno, Isago; and Tsukahara, Masaharu, 3,976,519.
Ohtsuka, Shyuichi; and Taguchi, Seiichi, to Fuji Photo Film Co., Ltd. Information recording with an organic compound capable of assuming two or more convertible stable aggregation states. 3,977,009, Cl. 346-74.00R.
Okachi, Ryo: *See—*
Nara, Takashi; Takasawa, Seigo; Okachi, Ryo; Kawamoto, Isao; Yamamoto, Mitsuyoshi; Sato, Seiji; and Sato, Tomoyasu, 3,976,768.
Okada, Takashi: *See—*
Ishigaki, Yoshio; and Okada, Takashi, 3,976,951.
Okano, Masao, to Toyo Valve Co., Ltd. Copper alloy of excellent corrosion resistance, mechanical strength and castability. 3,976,478, Cl. 75-156.500.
O'Keefe, Daniel A.: *See—*
Gomes, John M.; and O'Keefe, Daniel A., 3,976,761.
Okudaira, Sadao: *See—*
Takahashi, Yasuo; and Okudaira, Sadao, 3,976,367.
Okuma Machinery Works, Ltd.: *See—*
Adachi, Nokihisa; and Oda, Tetuzo, 3,975,928.
Olin Corporation: *See—*
Crane, Jacob; and Shapiro, Eugene, 3,976,477.
Scott, Robert N.; Lederle, Henry F.; Milnes, Frank J.; and Raymond, Maurice A., 3,976,675.
Wojtowicz, John A., 3,976,756.
Oline, James A.: *See—*
Williams, Alan D.; Powell, John A.; Carty, Daniel T.; and Oline, James A., 3,976,723.
Ollendick, Gary B.: *See—*
Berry, James M.; Hauser, Anthony J.; Knuth, Kurt E.; and Ollendick, Gary B., 3,977,007.
Olmsted, Dennis R.: *See—*
Derby, Howard L.; Epina, August P.; Olmsted, Dennis R.; Platter, Sanford; and Herger, Zoltan L., 3,975,789.
Olsen, Oliver Albert, to Bendix Corporation, The. Visual method of locating faults in printed circuit boards. 3,976,383, Cl. 356-166.000.
Olson, Robert D.; and Eifler, Robert H., to General Foods Corporation. Breakfast cereal process and product. 3,976,793, Cl. 426-96.000.
Olson, Rueben C. Digger tooth means for front loader buckets. 3,975,844, Cl. 37-117.500.
Olsson, Erik Allan. Method of and apparatus for converting molten metal into a semi-finished or finished product. 3,976,117, Cl. 164-48.000.
Olympus Optical Co., Ltd.: *See—*
Morokuma, Tadashi, 3,976,379.
Nakagawa, Jihei, 3,976,365.
Yamashita, Nobuo, 3,976,366.
Ondetti, Miguel Angel; and Condon, Edward, to E. R. Squibb & Sons, Inc. Pyrrolidine derivatives. 3,976,660, Cl. 260-326.430.
Ong, Daniel, to U.S. Philips Corporation. Injection syringe with cartridge retaining tab. 3,976,069, Cl. 128-218.00D.
Onoda Cement Company, Ltd.: *See—*
Itoh, Tsutomu, 3,976,031.
Kudo, Norihiro; and Ibe, Hiroshi, 3,976,494.
Opto-Produkte AG: *See—*
Rottenkolber, Hans; and Steinbichler, Hans, 3,976,380.
Orain, Michel, to Glaenzer Spicer. Homokinetic transmission joint. 3,975,922, Cl. 64-21.000.
Orgonics, Inc.: *See—*
O'Donnell, James M., 3,976,465.
Origo, Inc.: *See—*
Lundquist, Ingemar H., 3,976,068.
Lundquist, Ingemar H., 3,976,402.
Oronzio de Nora Impianti Elettrochimici S.p.A.: *See—*
De Nora, Vittorio, 3,976,556.
Oronzio de Nora Implanti Elettrochimici S.p.A.: *See—*
De Nora, Oronzio; and De Nora, Vittorio, 3,976,550.
Orr, Clyde, Jr.: *See—*
Ball, Dean M.; Camp, Ronnie W.; Hendrix, Warren P.; and Orr, Clyde, Jr., 3,975,946.
Osaki, Toshiyuki: *See—*
Inouye, Sakae; Kurahashi, Suminobu; Wada, Norio; Kikuchi, Motokazu; Masuda, Kinji; Akiyama, Tsuneharu; and Osaki, Toshiyuki, 3,976,624.
Osborn, Merritt A.; and Dodson, Osborne C. Tight chain composite gear device. 3,975,969, Cl. 74-465.000.
Osborne, James Herschell: *See—*
Calcaterra, Bernard Jacob; Ogg, Harold Edward, Jr.; and Osborne, James Herschell, 3,975,828.
Osterreichische Mineralolverwaltung Aktiengesellschaft: *See—*
Schwarz, Ferdinand; and Bauer, Erich, 3,976,432.
Ostic, Alonzo M., to Rockford Servo Corporation. Sliding spool type valve and method of making the same. 3,976,103, Cl. 137-625.690.
Owens-Corning Fiberglas Corporation: *See—*
Wardlaw, William G., 3,976,464.
Owens-Illinois, Inc.: *See—*
Ernsthausen, Roger E., 3,976,823.
Miavecz, Joseph L.; Spry, Donald J.; and Wojcik, David S., 3,976,912.
Mueller, Martin, 3,976,196.
Pei, Yu K., 3,976,463.
Smalley, Ned J., 3,976,215.
Owens, Michael; and Knoble, David W., to General Electric Company. Operating circuit for discharge lamps with voltage starting circuit and auxiliary lighting means therefor. 3,976,910, Cl. 315-92.000.
Oxel, Berton R., to Hoover Company, The. Rotatable and vertically adjustable rack. 3,976,000, Cl. 99-446.000.
Oyaba, Takashi: *See—*
Tamura, Masahiko; Iwama, Kiyonori; Yoshimi, Toshikazu; and Oyaba, Takashi, 3,976,897.
Ozark-Mahoning Company: *See—*
Douglas, Clarence J., 3,976,445.
P. Ferrero & C. S.p.A.: *See—*
Dogliotti, Amilcare, 3,976,193.
P. R. Mallory & Co. Inc.: *See—*
Klein, Gerhart P., 3,976,435.
Pacific Electricord Company: *See—*
Hodgson, Robert J.; and Clark, Henry, 3,976,201.
Padrutt, Paul W.: *See—*
Baron, George B.; and Padrutt, Paul W., 3,976,211.
Pagnoni, Russell W. Article storing and dispensing unit. 3,976,219, Cl. 221-310.000.
Palitex Project-Company G.m.b.H.: *See—*
Franzen, Gustav, 3,975,893.
Palladino, Nicola; Mazzei, Marcello; Bacchin, Paolo; and Marconi, Walter, to Snam Progetti S.p.A. Photodegradable copolymers of ethylene and vinyl alcohol containing ketoether groups. 3,976,621, Cl. 260-66.000.
Pallos, Ferenc M.: *See—*
Arneklev, Duane R.; Pallos, Ferenc M.; and Gaughan, Edmund, 3,976,469.
Palmstiernas Mekaniska Verkstad AB: *See—*
Mornberg, Gustav, 3,975,977.
Pampus, Gottfried: *See—*
Schnoring, Hildegard; Pampus, Gottfried; Schon, Nikolaus; and Witte, Josef, 3,976,609.
Panduit Corporation: *See—*
Caveney, Jack E.; Moody, Roy A.; Fulton, Ronald T.; and Rehling, Charles J., 3,976,108.
Panetta, Patrick F.: *See—*
Glasser, Herman; and Panetta, Patrick F., 3,976,050.
Panis, Martinus Johannes Josephus Maria, to Van Doorne's Bedrijfswagenfabriek DAF B.V. Device to control a lifting cylinder. 3,975,987, Cl. 91-420.000.
Paris, Wayne H.; Wolfe, Ronald C.; Fay, Terrence P.; and Lindquist, Robert D., to Avon Products, Inc. Soap bar manufacture. 3,976,736, Cl. 264-148.000.
Parker, Delmer G., to Xerox Corporation. Arrangement for stabilizing corona devices. 3,976,881, Cl. 250-324.000.
Parker, Ernest George: *See—*
Landucci, Louis; McKay, Donald Roderick; and Parker, Ernest George, 3,976,743.
Parkinson, Kelvin L.; and Austin, Joseph M., to Honeywell Information Systems, Inc. Coupler for providing data transfer between host and remote data processing units. 3,976,979, Cl. 340-172.500.
Parkinson, Thomas F., to Electra-Tronics, Inc. Photoelectric detector for smoke or the like. 3,976,891, Cl. 250-575.000.
Partin, Clyde, to Anaconda Company, The. Cleaning of dry catalyst beds. 3,976,086, Cl. 134-6.000.
Patecell, Theodore C. Sectional run-flat tire insert with coupling means, permitting automatic installation. 3,976,114, Cl. 152-158.000.
Patel, Bhupendra C.: *See—*
Dye, John F.; Binard, William J.; and Patel, Bhupendra C., 3,976,278.
Patel, Chhotubhai N.; and Scofield, Donald W., to Ford Motor Company. Plate and fin heat exchanger. 3,976,128, Cl. 165-153.000.
Patience, Donald: *See—*
Fitzgerald, Harry G.; and Patience, Donald, 3,976,074.
Patterson, Garvin Wesley; and Porter, Marion G., to Honeywell Information Systems, Inc. Method of generating addresses to a paged memory. 3,976,978, Cl. 340-172.500.
Patterson, Garvin Wesley: *See—*
Porter, Marion G.; Patterson, Garvin Wesley; Shelly, William A.; and Lemak, Nicolas S., 3,976,977.
Patterson, John A.: *See—*
Kolaian, Jack H.; Patterson, John A.; and Ward, Frank K., 3,976,682.
Patterson, Lawrence. Cleaning apparatus having ultraviolet lamp fixture. 3,975,790, Cl. 15-339.000.
Pattison, James Edward: *See—*
Irving, Leonard David; Pattison, James Edward; and Rees, Huw David, 3,977,015.
Paull, Peter L.; and Schlinger, Warren G., to Texaco Inc. Synthesis gas from gaseous CO_2-solid carbonaceous fuel feeds. 3,976,442, Cl. 48-197.00R.
Paull, Peter L.; and Schlinger, Warren G., to Texaco Inc. Synthesis gas from solid carbonaceous fuel. 3,976,443, Cl. 48-197.00R.
Pawling Rubber Corporation: *See—*
Watson, Bert E., 3,975,916.

Paxson, Timm E.: *See—*
Hawthorne, Marion F.; and Paxson, Timm E., 3,976,596.
Peabody Dore' Corporation: *See—*
Murphree, Burleigh R., 3,976,312.
Pearlman, Edward D. Triggering circuit. 3,976,921, Cl. 317-135.00R.
Peck, David B.; and Geissler, Edward C., to Sprague Electric Company. Low impedance multiple electrolytic capacitor assembly. 3,976,922, Cl. 317-231.000.
Peel, Robert, to National Association of Hosiery Manufacturers, Inc. Support hosiery testing apparatus and method. 3,975,956, Cl. 73-159.000.
Pei, Yu K., to Owens-Illinois, Inc. Apparatus for fusion bonding tubular recuperator structures. 3,976,463, Cl. 65-152.000.
Pennwalt Corporation: *See—*
Hager, Robert Bonner, 3,976,698.
Merchant, Dhirendra Ranchhoddas; and Hodges, Jimmie Ray, 3,976,447.
Popoff, Ivan Christoff; and Haines, Paul Gordon, 3,976,648.
Pera, John D.: *See—*
Buckman, Stanley J.; Fenyes, Joseph G. E.; Pera, John D.; and Wienert, Lester A., 3,976,495.
PerDue, James E., to General Tire & Rubber Company, The. Chopping machine. 3,976,252, Cl. 241-46.020.
Perkins, John F., Jr.; and Leja, Ilmars, to Raytheon Company. Analog divider circuitry. 3,976,894, Cl. 307-229.000.
Perry, Arthur Lee. Tobacco rack. 3,976,319, Cl. 294-5.500.
Personal Products Company: *See—*
Chinai, Kays; and Amend, Alfred, 3,976,075.
Pesavento, Joseph A.: *See—*
Smith, Jack R.; Burrows, Leonard H.; Heiser, Richard S.; Hertz, Richard J.; Pesavento, Joseph A.; Reuther, John F.; Shields, James J.; and Yannone, Robert A., 3,975,902.
Pestel, Gary M.: *See—*
Kohler, Gunter A.; and Pestel, Gary M., 3,976,762.
Peters, Leo. Package for demolding embossed butter and margarine. 3,976,796, Cl. 426-115.000.
Petersen, Fritz: *See—*
Wiebke, Gunter; Korsten, Andreas; Benecke, Theodor; and Petersen, Fritz, 3,976,829.
Petersen, Paul E.; and Schulze, Richard G., to Honeywell Inc. Gallium phosphide photodetector having an as-grown surface and producing an output from radiation having energies of 2.2 eV to 3.8 eV. 3,976,872, Cl. 250-211.00R.
Petit, Jean-Francois: *See—*
Adam, Arlette; Berger, Frank; Chedid, Louis; Lederer, Edgar; Petit, Jean-Francois; and Ciorbaru, Rita, 3,976,544.
Petrolite Corporation: *See—*
Hartke, Francis J.; and Davis, James E., 3,976,593.
Link, John, 3,976,428.
Petrovich, Vojislav. Froth flotation method for the recovery of minerals by means of quaternary ammonium nitrites and ternary phosphine dinitrites. 3,976,565, Cl. 209-166.000.
Petrovich, Vojislav. Froth flotation method for the recovery of minerals by means of quaternary phosphonium nitrites and ternary phosphine dinitrites. 3,976,566, Cl. 209-166.000.
Pettibone Corporation: *See—*
Brown, Wilburn Kelly, 3,976,124.
Petty, Walter L., to Shell Oil Company. Highly unsaturated polyethers. 3,976,602, Cl. 260-2.0EP.
Pfefferle, William C., to Engelhard Minerals & Chemicals Corporation. Method and apparatus for turbine system combustor temperature. 3,975,900, Cl. 60-39.030.
Pfizer Inc.: *See—*
Cox, David A.; Barnish, Ian T.; and Evans, Anthony G., 3,976,783.
Johnson, Michael R., 3,976,650.
Philip Morris Incorporated: *See—*
Reininghaus, Wolf, 3,976,053.
Phillips Petroleum Company: *See—*
Carrow, Guy E.; and Rees, Robert L., 3,976,821.
Delap, Joseph A., 3,976,632.
Smith, David R.; and Zelinski, Robert P., 3,976,630.
Warner, Paul F., 3,976,551.
Picandet, Jean, to Jeumont-Schneider. Electronic time switching telephone system. 3,976,841, Cl. 179-15.0AT.
Picker Corporation: *See—*
Brunnett, Carl J.; Cox, Jerome R., Jr.; Snyder, Donald L.; and Mattson, Rodney A., 3,976,885.
Pietsch, Gunter E. W.: *See—*
Walter, Gerhard H. W.; and Pietsch, Gunter E. W., 3,976,534.
Pifferi, Giorgio, to ISF SpA. 4-Cyclopropylmethyleneoxy-3-chlorophenylacetic acid and salts thereof. 3,976,673, Cl. 260-438.100.
Pilarczyk, Karol, to Norwalk-Turbo, Inc. Lubricating and oil seal system for a high speed compressor. 3,976,165, Cl. 184-6.160.
Pinero, Emilio Perez, deceased (by Aroca, Consuelo Belda, legal heir). System of articulated planes. 3,975,872, Cl. 52-71.000.
Pioneer Electronic Corporation: *See—*
Tamura, Masahiko; Iwama, Kiyonori; Yoshimi, Toshikazu; and Oyaba, Takashi, 3,976,897.
Piro, Mario, to Nuova San Giorgio S.p.A. Apparatus for positioning needle selecting cylinders in a circular knitting machine. 3,975,925, Cl. 66-50.00B.
Pitea Maskin Industri Nystrom & Larsson AB: *See—*
Larsson, Gosta; and Nystrom, Kjell Signar, 3,976,271.
Pitler, Richard K.: *See—*
Blank, Denis A.; Falkowski, Edward C.; and Pitler, Richard K., 3,976,517.
Pitner, Alfred, to Nadella, a part interest. Device for mounting a radial rolling bearing. 3,976,340, Cl. 308-184.00R.
Pitney-Bowes, Inc.: *See—*
Carnes, W. Robert, Jr.; Selnick, Lester L.; and Balogh, John, Jr., 3,976,198.
Plasser, Franz; Theurer, Josef; and Folser, Karl, to Franz Plasser Bahnbaumaschinen-Industrie Gesellschaft m.b.H. Ballast treating apparatus. 3,976,142, Cl. 171-16.000.
Platter, Sanford: *See—*
Derby, Howard L.; Epina, August P.; Olmsted, Dennis R.; Platter, Sanford; and Herger, Zoltan L., 3,975,789.
Plesinger, Boris M.: *See—*
Lawrence, Philip E.; and Plesinger, Boris M., 3,976,299.
Plessey Handel und Investments A.G.: *See—*
Harrison, Ronald Arthur, 3,976,900.
Larner, Douglas Stanley; Thillainayagam, Velauthar Kopalapillai; Blackmore, Ronald William; and Hill, Barry Michael Ernest, 3,976,835.
Matthews, Peter Charles; and Beech, Brian Herbert, 3,976,384.
Plummer, William T.: *See—*
McCann, Mary Conlin; Plummer, William T.; and Walworth, Vivian K., 3,976,368.
Polacek, Bohumil, to Zavody tazkeho strojarstva, nardoni podnik. Hydrostatic servomechanism with artificial feedback. 3,975,907, Cl. 60-386.000.
Polaczek, Jerzy: *See—*
Motyczynski, Ryszard; Franaszek, Tadeusz; Kurzydlo, Mieczyslaw; and Polaczek, Jerzy, 3,976,422.
Polaroid Corporation: *See—*
Borror, Alan L.; and Cincotta, Louis, 3,976,493.
Borror, Alan L.; and Cincotta, Louis, 3,976,640.
Borror, Alan L., 3,976,659.
Erlichman, Irving, 3,977,012.
Greenwald, Richard B., 3,976,647.
Karger, Eva R.; and MacGregor, Paul T., 3,976,662.
Land, Edwin H., 3,976,486.
Levy, Boris, 3,976,489.
Macleish, William T., 3,976,490.
McCann, Mary Conlin; Plummer, William T.; and Walworth, Vivian K., 3,976,368.
Norris, Philip R., 3,977,014.
Svatek, Thomas A., 3,977,013.
Polata, Bohumil: *See—*
De Nora, Vittorio; and Polata, Bohumil, 3,976,512.
Polymir Industries, Inc.: *See—*
Middleton, Gary Lee, Sr., 3,976,248.
Polysar Limited: *See—*
Buckler, Ernest Jack; and Richmond, Michael Hugh, 3,976,608.
Polysius AG: *See—*
Kluger, Wolfgang; and Huser, Heinz, 3,976,331.
Pomaski, Charles J. Ear wire construction. 3,975,921, Cl. 63-13.000.
Ponce, Rodger G.: *See—*
Herrera, Frank J.; and Ponce, Rodger G., 3,976,188.
Popeil Brothers, Inc.: *See—*
Popeil, Samuel Joseph, 3,976,413.
Popeil, Samuel Joseph, to Popeil Brothers, Inc. Adjustable fish bait forming device. 3,976,413, Cl. 425-117.000.
Popelak, Alfred: *See—*
Leinert, Herbert; Popelak, Alfred; Stach, Kurt; Bartsch, Wolfgang; and Dietmann, Karl, 3,976,779.
Popoff, Ivan Christoff; and Haines, Paul Gordon, to Pennwalt Corporation. Pyridine adducts of oxazolidine and thiazolidine-derived carbodithioates. 3,976,648, Cl. 260-270.0PY.
Popov, Jury Olegovich: *See—*
Alien, Imant Karlovich; Avdeev, Ivan Ivanovich; Gelfandbein, Yakov Aronovich; Ershov, Boris Nikolaevich; Nikonenko, Anatoly Vasilievich; Popov, Jury Olegovich; Khesin, Arkady Yakovlevich; and Yanson, Boris Albertovich, 3,976,827.
Popova, Alexandra Ljudovikovna: *See—*
Andreeva, Viktoria Ivanovna; Popova, Alexandra Ljudovikovna; and Lapatukhin, Veniamin Semenovich, 3,976,523.
Porepp, Bernd. Method of making a slide fastener. 3,976,106, Cl. 139-384.00B.
Porter, Marion G.; Patterson, Garvin Wesley; Shelly, William A.; and Lemak, Nicolas S., to Honeywell Information Systems, Inc. Processor for input-output processing system. 3,976,977, Cl. 340-172.500.
Porter, Marion G.: *See—*
Patterson, Garvin Wesley; and Porter, Marion G., 3,976,978.
Possati, Mario, to Finike Italiana Marposs Soc. In Accomandita Semplice di Mario Possati & C. Measuring device for mechanical workpieces. 3,975,829, Cl. 33-169.00R.
Post Office, The: *See—*
Matthews, Michael Robert, 3,976,355.
Poteiko, Andrei Ivanovich: *See—*
Kalnin, Igor Martynovich; Tsirlin, Beniamin Lvovich; Bukhter, Elena Zalmanovna; Terenina, Alexandra Dmitrievna; Eremkina, Galina Ivanovna; Poteiko, Andrei Ivanovich; and Breslov, Khanon Yakovlevich, 3,976,395.
Potoski, John R.: *See—*
Freed, Meier E.; and Potoski, John R., 3,976,693.
Freed, Meier E.; and Potoski, John R., 3,976,696.
Potseluiko, Vladimir Nikolaevich: *See—*
Dudko, Daniil Andreevich; Samsonov, Grigory Valentinovich;

Maximovich, Boleslav Ivanovich; Zelenin, Vitaly Ivanovich; Klimanov, Alexandr Sergeevich; Potseluiko, Vladimir Nikolaevich; Trunov, Gennady Vasilievich; and Sleptsov, Vasily Mikhailovich, 3,976,481.

Potts, John C.: *See—*
Kompare, John W.; Potts, John C.; and Simpson, James L., 3,976,460.

Povetkin, German Mitrofanovich: *See—*
Morgulis, Jury Borisovich; Povetkin, German Mitrofanovich; Kaminsky, Valery Naumovich; and Kochetov, Vyacheslav Alexandrovich, 3,975,911.

Powell, John A.: *See—*
Williams, Alan D.; Powell, John A.; Carty, Daniel T.; and Oline, James A., 3,976,723.

Powers-FIAT Corporation: *See—*
Klimboff, Morris; and Harvey, Wilfred G., Sr., 3,975,781.

Powers, Robert W.; Mitoff, Stephan P.; and Szymalak, Edward, to General Electric Company. Method of forming beta-alumina articles. 3,976,554, Cl. 204-181.000.

PPG Industries, Inc.: *See—*
Kompare, John W.; Potts, John C.; and Simpson, James L., 3,976,460.
Sutara, Steve J., 3,976,462.

Pratt, Stanley L. Apparatus for monitoring the selection of chart recording and wavelength scanning speeds in a radiant energy analyzer. 3,976,378, Cl. 356-96.000.

Preiswerk, Martin: *See—*
Avar, Lajos; Hofer, Kurt; and Preiswerk, Martin, 3,976,658.

Prentice, Thomas H. Cutting apparatus with rotatable anvil. 3,975,976, Cl. 83-556.000.

Presto Lock Company, Division of Walter Kidde & Company, Inc.: *See—*
Bako, Lazlo, 3,975,933.

Pringle, William L., to United States Steel Corporation. Sofa bed. 3,975,783, Cl. 5-18.00R.

Process Computer Systems, Inc.: *See—*
Barnich, Richard G., 3,975,954.

Procter & Gamble Company, The: *See—*
Ericson, Kenneth R.; and Smith, Ernest S., 3,976,224.
Fanta, Wayne I., 3,976,663.
Rose, Terence James, 3,976,581.

Przedsiebiorstwo Projektowania i Wyposazania Odlewni "Prodlew": *See—*
Motyczynski, Ryszard; Franaszek, Tadeusz; Kurzydlo, Mieczyslaw; and Polaczek, Jerzy, 3,976,422.

Pullman Incorporated: *See—*
Carr, George W., 3,976,310.

Purvis, Howard A.: *See—*
Jandrasi, Frank J.; and Purvis, Howard A., 3,976,094.

Puschel, Siegfried; and Turkowski, Jan, to Linde Aktiengesellschaft. Circuit for the energization of an electric motor with time delay. 3,976,927, Cl. 318-421.000.

Pyles Industries, Inc.: *See—*
Jackson, Jordan S., 3,976,229.

Quaker Oats Company, The: *See—*
Buix, Louis F.; Gribnitz, Harry J.; and Hohner, Gary A., 3,976,208.

Quaker State Oil Refining Corporation: *See—*
Bailey, James B., 3,976,109.

Questor Corporation: *See—*
Stahel, Alwin J., 3,976,328.

Quick, John L.; and Wyncott, Daniel D., to Baxter Laboratories, Inc. Vial and syringe connector assembly. 3,976,073, Cl. 128-272.000.

R. A. Jones & Company, Inc.: *See—*
Jones, Wickliffe, 3,975,888.

R. M. Wade & Co.: *See—*
Cornelius, Gail, 3,976,093.

Raab, Hans: *See—*
Trattner, Hermann; and Raab, Hans, 3,976,853.

Raab, Rainer: *See—*
Wagner, Kuno; Eimer, Johannes; Zirner, Joachim; Raab, Rainer; and Liebsch, Dietrich, 3,976,622.

Raab, Stefan, to Demag Aktiengesellschaft. Casting arrangement for forming plate-shaped metal parts. 3,976,120, Cl. 164-330.000.

Raacke, Karl Heinz: *See—*
Babinski, John Paul; Bertelsen, Bruce Irving; Raacke, Karl Heinz; Sirgo, Valdeko Harry; and Townsend, Clarence Jay, 3,976,330.

Radenovic, Branko J. Shift mechanism for standard transmission. 3,975,971, Cl. 74-473.00R.

Ragsdale, Philip W.; and Stephens, Sidney M. Portable pressure spray liquid seed treater. 3,976,030, Cl. 118-303.000.

Rahlfs, Herbert; and Hardt, Udo, to Reifenhauser KG. Apparatus for calibrating synthetic-resin tubing. 3,976,411, Cl. 425-72.00R.

Ralston, Harold A.; and Venable, Phillip G., to J. I. Case Company. Spring automatic reset plow assembly with reset damper system. 3,976,144, Cl. 172-267.000.

Ramage, William, to Honeywell Information Systems Limited. Self-clocking punched record reader. 3,976,856, Cl. 235-61.11R.

Ramot University for Applied Research and Industrial Development Ltd.: *See—*
Seidman, Ady; Avrahami, Zohar; Sheinfux, Benjamin; and Grinberg, Jan, 3,976,905.

Ramser, Forrest L.; and Skinner, Mark, to Chore-Time Equipment, Inc. Poultry maintenance system having moving cages. 3,976,032, Cl. 119-18.000.

Ramsey Rec Ltd.: *See—*
Wilson, George S.; and Sniezek, Joseph T., 3,976,150.

Randell, Forrest Thomson, to Weir Pumps Limited. Rotodynamic fluid pumps. 3,976,391, Cl. 415-53.00R.

Randolph, Hollis L.: *See—*
McIntosh, Harold A.; Randolph, Hollis L.; and Hull, Bradford N., 3,976,956.

Rank Organisation, Limited, The: *See—*
Millward, John David, 3,976,832.

Rank Xerox Ltd.: *See—*
Hickman, Robert George, 3,976,374.

Raudys, Vytas A.: *See—*
Kupcikevicius, Vytautas; Nausedas, Joseph A.; and Raudys, Vytas A., 3,975,795.

Ray, Manuel C., to ROK Industries, Inc. Liquid chemical dispensing unit. 3,976,227, Cl. 222-136.000.

Rayburn, James W.: *See—*
Wu, Yao Hua; and Rayburn, James W., 3,976,776.

Raychem Corporation: *See—*
Klopfer, Henry Edward, 3,976,385.

Raymond Lee Organization, Inc., The: *See—*
Laureta, Laurie, 3,976,293.
Smith, Haldon J., 3,975,941.

Raymond, Maurice A.: *See—*
Scott, Robert N.; Lederle, Henry F.; Milnes, Frank J.; and Raymond, Maurice A., 3,976,675.

Raymond, Robert E., to International Basic Economy Corporation. Hydraulic motor control apparatus. 3,976,098, Cl. 137-608.000.

Raytheon Company: *See—*
Perkins, John F., Jr.; and Leja, Ilmars, 3,976,894.
Wagner, Ronald A., 3,977,000.

RCA Corporation: *See—*
Campbell, Alleyne Resue, 3,976,867.
Engstrom, Ralph Warren; and Bowser, David Eugene, 3,976,875.
Haslau, Horst Eugen; and Mattson, Glenn Arvid, 3,976,256.
Longbottom, John Douglas, 3,976,016.
Longsderff, Richard William; and Kaiser, Donald Bernard, 3,976,956.
Tomcavage, Joseph Richard, 3,976,909.
Wu, Chin Tao, 3,976,996.
Wu, Chung Pao; Douglas, Edward Curtis; and Mueller, Charles William, 3,976,377.

Readnour, Jack L.: *See—*
Tarter, David A.; and Readnour, Jack L., 3,976,394.

Re Baratelli, Giuseppe. Printing press register guides. 3,976,006, Cl. 101-414.000.

Recognition Equipment Incorporated: *See—*
Martin, Charles E.; Requa, Stanley C., deceased; and Muir, William, 3,976,973.

Redel, Karl Georg, to Leybold-Heraeus GmbH & Co. KG. Electron beam generator with linear cathode. 3,976,908, Cl. 313-146.000.

Redon, Georges, to Unelec. Load limiter. 3,976,851, Cl. 200-85.00R.

Rees, Huw David: *See—*
Irving, Leonard David; Pattison, James Edward; and Rees, Huw David, 3,977,015.

Rees, Robert L.: *See—*
Carrow, Guy E.; and Rees, Robert L., 3,976,821.

Regan, Bernard M., to Baxter Laboratories, Inc. Antipsychotic agents. 3,976,788, Cl. 424-342.000.

Regie Nationale des Usines Renault: *See—*
Henault, Claude, 3,976,039.

Rehling, Charles J.: *See—*
Caveney, Jack E.; Moody, Roy A.; Fulton, Ronald T.; and Rehling, Charles J., 3,976,108.

Rehn, Victor L.: *See—*
Bottka, Nicholas; Teppo, Edward A.; and Rehn, Victor L., 3,976,873.

Rehnman, Kjell, to Allmanna Svenska Elektriska Aktiebolaget. Controlled static convertor for motor control and control angle limiting arrangement. 3,976,930, Cl. 321-5.000.

Reichman, Ronald, to Singer Company, The. Computer applications trainer. 3,975,835, Cl. 35-13.000.

Reick, Franklin G., to Ebert, Michael, a part interest. Aircraft fuel contaminant tester. 3,976,572, Cl. 210-94.000.

Reifenhauser KG: *See—*
Rahlfs, Herbert; and Hardt, Udo, 3,976,411.

Reinhold, Donald F., to Merck & Co., Inc. Process for preparing 3-fluoro-D-alanine and its deutero analogs. 3,976,689, Cl. 260-534.00C.

Reininghaus, Wolf, to Philip Morris Incorporated. Apparatus and methods for use in measuring respiration characteristics. 3,976,053, Cl. 128-2.080.

Reinke, Friedhelm; Voss, Hermann; and Geisel, Herbert, to AEG Elotherm G.m.b.H. Pipe and process for producing a welded and quench hardened steel. 3,976,520, Cl. 148-127.000.

Rembold, Heinz: *See—*
Lohse, Friedrich; Rembold, Heinz; Baumann, Dieter; and Munk, Kurt, 3,976,676.

Remus, Casimer Frank, to Bendix Corporation, The. Paired coiled conductors compact-long life. 3,976,965, Cl. 336-120.000.

Repik, Albert J.; Miller, Charles E.; and Johnson, Homer R., to Westvaco Corporation. Fluidized bed process for making activated carbon including heating by conduction through the distributor plate. 3,976,597, Cl. 252-445.000.

Requa, Stanley C., deceased: *See—*
Martin, Charles E.; Requa, Stanley C., deceased; and Muir, William, 3,976,973.

Research Corporation: *See—*
Kupchan, S. Morris; and Liepa, Andris J., 3,976,652.

Reuther, John F.: *See—*
Smith, Jack R.; Burrows, Leonard H.; Heiser, Richard S.; Hertz, Richard J.; Pesavento, Joseph A.; Reuther, John F.; Shields, James J.; and Yannone, Robert A., 3,975,902.

Rexnord Inc.: *See—*
Brown, Elwood B., 3,976,177.

Reynolds, Richard L., to Litton Fastening Systems. Method of forming a threaded female fastener. 3,975,788, Cl. 10-86.00A.

Rhodia, Inc.: *See—*
DeSimone, Robert S., 3,976,700.

Rhone-Poulenc S.A.: *See—*
Rio, Andre, 3,976,571.

Richard, William R., Jr.: *See—*
Herber, John F.; Street, Robert W.; and Richard, William R., Jr., 3,976,585.

Richards, William; and Grolman, Bernard, to American Optical Corporation. Artificial intraocular lens and supporting system therefor. 3,975,779, Cl. 3-13.000.

Richmond, Michael Hugh: *See—*
Buckler, Ernest Jack; and Richmond, Michael Hugh, 3,976,608.

Richter, Sidney B.; and Wu, Chin Ching, to Velsicol Chemical Corporation. N-(alkylideneaminooxymethyl)-alpha-haloacetanilides. 3,976,471, Cl. 71-105.000.

Richter, Sven U. K. A., to Sanitized, Inc. Aminobenzenesulfonylacrylamides. 3,976,668, Cl. 260-397.600.

Rigdon, Orville W.: *See—*
Kuntschik, Lawrence F.; and Rigdon, Orville W., 3,976,697.

Riker Laboratories, Inc.: *See—*
Conway, Alvin C., 3,976,774.
Gerster, John F.; and Leir, Charles M., 3,976,651.

Rim, Yong S.; and Nudenberg, Walter, to Uniroyal Inc. Certain dodecahalo-9, 10-oxadecahydro-1,4:5,8-dimethanoanthracenes. 3,976,664, Cl. 260-346.20M.

Rineer Hydraulics, Inc.: *See—*
Gerlach, Charles R., 3,976,407.

Rio, Andre, to Rhone-Poulenc S.A. Redox resin process. 3,976,571, Cl. 210-38.00B.

Robbins, Allen Blaine. Liquid storage system. 3,976,228, Cl. 222-143.000.

Robert Bosch G.m.b.H.: *See—*
Brakel, Kornelius, 3,976,097.
Grozinger, Dieter, 3,975,966.
Leyendecker, Ralf; and Heinke, Gunter, 3,976,342.

Roberts, Earl J.; and Rowland, Stanley P., to United States of America, Agriculture. Preparation of ethylenimine prepolymer. 3,976,604, Cl. 260-2.0EN.

Robertshaw Controls Company: *See—*
McIntosh, Harold A.; Randolph, Hollis L.; and Hull, Bradford N., 3,976,966.

Robertson, Allan J.: *See—*
Corver, Hans A.; and Robertson, Allan J., 3,976,752.

Robertson, James E.: *See—*
Kendall, Giles A.; and Robertson, James E., 3,976,287.

Robins, Roland K.: *See—*
Witkowski, Joseph T.; and Robins, Roland K., 3,976,545.

Rockford Servo Corporation: *See—*
Ostic, Alonzo M., 3,976,103.

Rockwell International Corporation: *See—*
Grant, Louis R., 3,976,753.
Hertz, Theodore M., 3,976,980.

Rodewald, Paul G., to Mobil Oil Corporation. Normal paraffin alkylation with a catalyst of a Lewis acid and group VIII metal intercalated in graphite. 3,976,714, Cl. 260-683.470.

Rodger, Alexander J., to Slattery Manufacturing (Proprietary) Ltd. Automatic height control for harvesting machine. 3,975,890, Cl. 56-208.000.

Rodger, Alexander J., to Slattery Manufacturing (Proprietary) Ltd. Windrowing apparatus for peanut digger. 3,976,143, Cl. 171-101.000.

Rodhe, Peder Magnus: *See—*
Danell, Curt; Holmer, Bo Gunnar; and Rodhe, Peder Magnus, 3,976,831.

Rodier, Rene Jean, to Compagnie Honeywell Bull (Societe Anonyme). Device for the exact positioning of a movable part. 3,976,929, Cl. 318-594.000.

Roedel, Richard K. Measuring apparatus. 3,975,827, Cl. 33-80.000.

Rohm GmbH: *See—*
Gruber, Wilhelm; Schnierle, Franz; and Schroeder, Guenter, 3,976,754.

Rohm and Haas Company: *See—*
Williams, Alan D.; Powell, John A.; Carty, Daniel T.; and Oline, James A., 3,976,723.

ROK Industries, Inc.: *See—*
Ray, Manuel C., 3,976,227.

Roman, Steven A., to Shell Oil Company. Insecticidal sulfonium salts. 3,976,772, Cl. 424-248.000.

Ron Jones Marine Engineering, Inc.: *See—*
Jones, Ronald O., Sr., 3,976,027.

Rongved, Leif: *See—*
Firtion, Victor Andrew; Rongved, Leif; and Saunders, Thomas Edward, 3,976,923.

Rose, Terence James, to Procter & Gamble Company, The. Surface treating compositions containing ammonioamidate compounds. 3,976,581, Cl. 252-8.800.

Rosel, Wilhelm: *See—*
Aulich, Gunter; Schultz, Dieter; and Rosel, Wilhelm, 3,976,020.

Rosemount Engineering Company Limited: *See—*
Bowden, Keith Romilly Roskrudge, 3,976,981.

Rosner, George, to United States of America, Army. Liquid adhesive applicator. 3,976,029, Cl. 118-215.000.

Ross, Stephen R.: *See—*
Kaiser, Carl; and Ross, Stephen R., 3,976,695.

Ross, Stephen T.: *See—*
Kaiser, Carl; and Ross, Stephen T., 3,976,694.

Rossio, John H.: *See—*
Morton, Paul S.; and Rossio, John H., 3,976,046.

Roth, Walter L.: *See—*
Farrington, Gregory C.; and Roth, Walter L., 3,976,504.
Farrington, Gregory C.; and Roth, Walter L., 3,976,505.

Rothauser, Charles; and Thompson, Bruce R., to United Packages Limited. Drier. 3,975,833, Cl. 34-151.000.

Rothenstein, Julius, to United States of America, Navy. Nitroplasticized amine perchlorate flexible explosives. 3,976,522, Cl. 149-19.400.

Rottenkolber, Hans; and Steinbichler, Hans, to Opto-Produkte AG. Holographic arrangement for testing materials without destroying same. 3,976,380, Cl. 356-109.000.

Rowland, Stanley P.: *See—*
Roberts, Earl J.; and Rowland, Stanley P., 3,976,604.

Rowlson, Peter C.; and Schneider, Ronald J., to North American Products Corporation. Refuse cutter and trim saw unit. 3,976,112, Cl. 144-223.000.

Roy, Laura C. Garment constructions. 3,975,777, Cl. 2-211.000.

Royer, Jacques: *See—*
Jorigny, Gerard Andre; Royer, Jacques; and Trichard, Georges Edmond, 3,976,180.

Rudich, George, Jr., to Johnson Controls, Inc. Integral motor controller. 3,976,925, Cl. 318-257.000.

Ruff, Klemens, to Gea Luftkuhlergesellschaft Happel GmbH & Co. KG. Air cooled surface condenser. 3,976,126, Cl. 165-110.000.

Rupp, Gunther: *See—*
Voigt, Hans; and Rupp, Gunther, 3,976,934.

Ruppert, Jurgen: *See—*
Eder, Ulrich; Haffer, Gregor; Ruppert, Jurgen; Sauer, Gerhard; and Wiechert, Rudolf, 3,976,701.

Ruscher, Markus, to Maschinenfabrik Zeil J. Kruckels KG. Method of and appparatus for forming a package on a rotatable take-up device. 3,976,258, Cl. 242-75.510.

Russell, Duane K., to Western Gear Corporation. Multiple-passage, quick-disconnect coupling. 3,976,099, Cl. 137-614.010.

Russell, Raymond Sidney. Amphibious vehicle. 3,976,025, Cl. 115-1.00R.

Ruti Machinery Works Ltd.: *See—*
Karcher, Charles, 3,976,107.
Steiner, Alois, 3,976,105.

Ryder, Alan, to Solartron Electronic Group Limited, The. Reference voltage sources. 3,976,896, Cl. 307-297.000.

S.A.R.L. "ETUD": *See—*
Marrie, Paul, 3,975,998.

Saari, Walfred S., to Merck & Co., Inc. 3-(2,5-Dihydroxyphenyl)-alanine as a cardiac stimulant. 3,976,782, Cl. 424-319.000.

Sabes, Jean, to Societe Anonyme Dite: J. Sabes & Cie. Installation for handling stock-piled fragmentary materials. 3,976,189, Cl. 198-36.000.

Sabnis, Ajit V., to Sperry Rand Corporation. Magnetic suspension apparatus. 3,976,339, Cl. 308-10.000.

Sach, George Sidney: *See—*
Lee, Richard Martin; and Sach, George Sidney, 3,976,777.

Sadek, Safik E., to Dynatech Corporation. Methods of improving control of release rates and products useful in same. 3,976,071, Cl. 128-260.000.

Safety Laboratories, Inc.: *See—*
Amlong, William R., 3,976,067.

Sahlin International, Inc.: *See—*
Cagle, Harlan R., 3,975,992.

Sahm, Peter, to BBC Brown Boveri & Company Limited. High temperature alloy. 3,976,516, Cl. 148-32.000.

Saito, Teruo: *See—*
Matsunaga, Hiroomi; Tsuji, Kozo; and Saito, Teruo, 3,976,605.

Sakamoto, Kuniaki: *See—*
Satake, Kunio; Yamada, Tsuyoshi; Sakamoto, Kuniaki; Hayakawa, Kiyoshi; and Fukawa, Isaburo, 3,976,721.

Sakamoto, Yoichi: *See—*
Kubo, Takao; Ohtani, Tadao; Kojima, Shigeru; Kato, Nobuyuki; Kojima, Kiyoshi; Sakamoto, Yoichi; Konno, Isago; and Tsukahara, Masaharu, 3,976,519.

Salathiel, William M.: *See—*
Shaughnessy, Christopher M.; and Salathiel, William M., 3,976,140.

Salmond, William G., to Upjohn Company, The. Process and compounds. 3,976,636, Cl. 260-239.55R.

Salvesen, Robert H.; Malloy, Paul L.; Bartley, Erle E.; and Meyer, RoNel M., to Exxon Research and Engineering Company. Artificial roughage materials. 3,976,766, Cl. 424-83.000.

Samsonov, Grigory Valentinovich: *See—*
Dudko, Daniil Andreevich; Samsonov, Grigory Valentinovich; Maximovich, Boleslav Ivanovich; Zelenin, Vitaly Ivanovich; Klimanov, Alexandr Sergeevich; Potseluiko, Vladimir Nikolaevich; Trunov, Gennady Vasilievich; and Sleptsov, Vasily Mikhailovich, 3,976,481.

Samuels, Peter B.; and Wood, Ernest C. Securing devices for sutures. 3,976,079, Cl. 128-335.000.
Sanchez, Ramon. Auto wheels placer. 3,976,212, Cl. 214-332.000.
Sanders Associates, Inc.: *See—*
Sebestyen, George, 3,976,995.
Sandoz, Inc.: *See—*
Barcza, Sandor, 3,976,684.
Nadelson, Jeffrey; and Houlihan, William J., 3,976,634.
Sandoz Ltd.: *See—*
Avar, Lajos; Hofer, Kurt; and Preiswerk, Martin, 3,976,658.
Baumann, Hans-Peter, 3,976,427.
Sanitized, Inc.: *See—*
Richter, Sven U. K. A., 3,976,668.
Santic, Blaz, to Karl Mengele & Sohne. Tray-type elevator conveyor. 3,976,191, Cl. 198-154.000.
Sanwa Seiki Mfg. Co.: *See—*
Sekiguchi, Yukichi, 3,976,335.
Sekiguchi, Yukichi, 3,976,336.
Sapir, Said, to International Telephone and Telegraph Corporation. Anti-skid brake control system and components thereof. 3,976,954, Cl. 330-69.000.
Saralidze, Anton Lavrentievich: *See—*
Efremidi, Anatoly Lazarevich; and Saralidze, Anton Lavrentievich, 3,976,449.
Sartorius, Guy, to Societe des Aciers Fins de l'Est. Air-cooled refractory guide tube for a metallurgical furnace. 3,976,238, Cl. 266-99.000.
Sasaki, Yoshio, to Toyota Jidosha Kogyo Kabushiki Kaisha. Oil seal means of a rotary piston engine. 3,976,406, Cl. 418-142.000.
Satake, Kunio; Yamada, Tsuyoshi; Sakamoto, Kuniaki; Hayakawa, Kiyoshi; and Fukawa, Isaburo, to Asahi Kasei Kogyo Kabushiki Kaisha. Method of producing polystyrene composition. 3,976,721, Cl. 260-880.00R.
Sato, Akira: *See—*
Hinata, Masanao; Takei, Haruo; Sato, Akira; and Ikeda, Tadashi, 3,976,492.
Sato, Mitsunori: *See—*
Sekiguchi, Hideto; Sone, Masao; and Sato, Mitsunori, 3,976,737.
Sato, Seiji: *See—*
Nara, Takashi; Takasawa, Seigo; Okachi, Ryo; Kawamoto, Isao; Yamamoto, Mitsuyoshi; Sato, Seiji; and Sato, Tomoyasu, 3,976,768.
Sato, Tomoyasu: *See—*
Nara, Takashi; Takasawa, Seigo; Okachi, Ryo; Kawamoto, Isao; Yamamoto, Mitsuyoshi; Sato, Seiji; and Sato, Tomoyasu, 3,976,768.
Sauder, Reinhold. Wood frame building wall. 3,975,876, Cl. 52-282.000.
Sauer, Gerhard: *See—*
Eder, Ulrich; Haffer, Gregor; Ruppert, Jurgen; Sauer, Gerhard; and Wiechert, Rudolf, 3,976,701.
Saunders, Thomas Edward: *See—*
Firtion, Victor Andrew; Rongved, Leif; and Saunders, Thomas Edward, 3,976,923.
Saurenman, Donald G., to Consan Pacific Incorporated. Antistatic equipment. 3,976,916, Cl. 317-4.000.
Scalco, Emanuele, to Bell Telephone Laboratories, Incorporated. Dry reclamation of wire scrap. 3,976,563, Cl. 209-3.000.
Scans Associates, Inc.: *See—*
Smith, Richard L.; and Mosher, Peter J., 3,975,953.
Scardiglia, Frank: *See—*
Hokama, Takeo; and Scardiglia, Frank, 3,976,607.
Schachter, Jacob, to Ketek Electric Corporation. Portable currency detector. 3,976,199, Cl. 209-111.800.
Schall, Moritz: *See—*
Mickeler, Karl; and Schall, Moritz, 3,975,927.
Schalow, Rudolph D.; and Link, John T., to Energystics Corporation. Alarm circuit suitable for monitoring freezer temperature. 3,976,985, Cl. 340-228.00R.
Schatzler, Walter, to Webasto-Werk W.Baier KG. Crank drive for two-way openable sliding roofs of automobiles. 3,976,325, Cl. 296-137.00G.
Schenk, Peter, to Dzus Fastener Co., Inc. Front insert receptacle. 3,975,804, Cl. 24-221.00A.
Schering Aktiengesellschaft: *See—*
Eder, Ulrich; Haffer, Gregor; Ruppert, Jurgen; Sauer, Gerhard; and Wiechert, Rudolf, 3,976,701.
Schilt, Earl A.: *See—*
Houston, James E.; Gingrich, Reynard W.; and Schilt, Earl A., 3,976,430.
Schinabeck, Rainer, to American Velodur Metal, Inc. Composition and process for treating and repairing metallic and non-metallic surfaces. 3,976,613, Cl. 260-29.1SB.
Schlabach, Abner J.: *See—*
McAleer, William J.; Spier, Raymond E.; and Schlabach, Abner J., 3,976,547.
Schlinger, Warren G.: *See—*
Paull, Peter L.; and Schlinger, Warren G., 3,976,442.
Paull, Peter L.; and Schlinger, Warren G., 3,976,443.
Schloemann-Siemag Aktiengesellschaft: *See—*
Schmidt, Arno; and Mueller, Rudolf, 3,975,938.
Schlumberger Technology Corporation: *See—*
Chevalier, Philippe; and Seeman, Bronislav, 3,976,878.
Turcotte, Ronald E., 3,976,879.
Schmermund, Alfred. Drum storage device. 3,976,190, Cl. 198-37.000.
Schmid, Hans R. Calendar. 3,975,848, Cl. 40-110.000.
Schmidt, Arno; and Mueller, Rudolf, to Schloemann-Siemag Aktiengesellschaft. Roll changing device for rolling mills or the like. 3,975,938, Cl. 72-239.000.
Schmidt, Donald L.: *See—*
Thomas, Mary R.; Lalk, Robert H.; Evani, Syamalarao; and Schmidt, Donald L., 3,976,822.
Schmidt, Eckhard Wolfgang: *See—*
Giovanelli, Anton Alfred Arthur; and Schmidt, Eckhard Wolfgang, 3,976,820.
Schmidt, Ernst Machiel, to U.S. Philips Corporation. Flash lamp unit. 3,976,870, Cl. 240-1.300.
Schmidt, Jakob E. Brassiere having simulated nipples. 3,976,083, Cl. 128-425.000.
Schmidt, Theodor, to Ludwig-Ofag-Indugas Industrieofenanlagen GmbH. Cooled furnace transport roller. 3,976,423, Cl. 432-236.000.
Schmieg, Gerhard: *See—*
Faber, Walter; and Schmieg, Gerhard, 3,976,850.
Schmit, Theodore F., to Electronic Flag Poles, Inc. Flag hoist. 3,976,283, Cl. 254-146.000.
Schmitt, German. Intracardial stimulation electrode. 3,976,082, Cl. 128-418.000.
Schmitt, Gunter: *See—*
Holzermer, Gunter; and Schmitt, Gunter, 3,976,887.
Schmoch, Otto, to Kraftwerk Union Aktiengesellschaft. Rotor of disc construction for single-shaft gas turbine. 3,976,399, Cl. 416-201.00R.
Schneider, Ronald J.: *See—*
Rowlson, Peter C.; and Schneider, Ronald J., 3,976,112.
Schnierle, Franz: *See—*
Gruber, Wilhelm; Schnierle, Franz; and Schroeder, Guenter, 3,976,754.
Schnoring, Hildegard; Pampus, Gottfried; Schon, Nikolaus; and Witte, Josef, to Bayer Aktiengesellschaft. Process for the preparation of distributions. 3,976,609, Cl. 260-17.00R.
Schon, Nikolaus: *See—*
Schnoring, Hildegard; Pampus, Gottfried; Schon, Nikolaus; and Witte, Josef, 3,976,609.
Schrempp, Klaus: *See—*
Fabian, Wolfgang; and Schrempp, Klaus, 3,976,649.
Schrider, Michael Stanley: *See—*
Diehl, Robert Eugene; Schrider, Michael Stanley; and Kantor, Sidney, 3,976,785.
Schroder, Eckhard, to U.S. Philips Corporation. Prism arrangement for digital electro-optical light deflection systems. 3,976,360, Cl. 350-150.000.
Schroder, Gert, to U.S. Philips Corporation. Circuit arrangement for frequency division by non-integral divisors. 3,976,946, Cl. 328-39.000.
Schroeder, Guenter: *See—*
Gruber, Wilhelm; Schnierle, Franz; and Schroeder, Guenter, 3,976,754.
Schuler, Roland: *See—*
Liptak, Gabor; and Schuler, Roland, 3,976,901.
Schultz, Dieter: *See—*
Aulich, Gunter; Schultz, Dieter; and Rosel, Wilhelm, 3,976,020.
Schultz, Richard A., to BJ-HUGHES Inc., formerly Byron Jackson, Inc. Casing stabbing apparatus. 3,976,207, Cl. 214-2.500.
Schulze, Richard G.: *See—*
Petersen, Paul E.; and Schulze, Richard G., 3,976,872.
Schwarz, Ferdinand; and Bauer, Erich, to Osterreichische Mineralolverwaltung Aktiengesellschaft. Reactor having an austenite steel catalyst for purifying flue gas. 3,976,432, Cl. 23-288.0FC.
Schwizer, Kilian: *See—*
Koch, Evaristo; and Schwizer, Kilian, 3,976,178.
Science Applications, Inc.: *See—*
Acton, Lawrence Lee; Bartle, Ervin Roy, Jr.; and Hall, Gordon Dennis, 3,976,884.
SCM Corporation: *See—*
Cappotto, Samuel D., 3,976,182.
Cappotto, Samuel D., 3,976,184.
Johnson, Lawrence A.; and Walters, Larry A., 3,976,794.
Mueller Hans W.; Sherman, Howard F.; and Shattuck, Richard E., 3,976,181.
Scofield, Donald W.: *See—*
Patel, Chhotubhai N.; and Scofield, Donald W., 3,976,128.
Scott Paper Company: *See—*
Desjarlais, Robert C., 3,976,491.
Scott, Robert H.; and Gaulding, Dan L., to Celanese Corporation. Sulfonic acid-type catalysts useful in, for example, esterification reactions. 3,976,595, Cl. 252-428.000.
Scott, Robert N.; Lederle, Henry F.; Milnes, Frank J.; and Raymond, Maurice A., to Olin Corporation. Silicate-based surfactant composition. 3,976,675, Cl. 260-448.80R.
Scudder, Thomas J.: *See—*
Brunelle, Joseph A.; Mazzle, George J.; and Scudder, Thomas J., 3,976,880.
Sebestyen, George, to Sanders Associates, Inc. Precessing display pager. 3,976,995, Cl. 340-337.000.
Seeley, Robert L., to United States of America, Navy. Dual threshold magnetic proximity switch. 3,976,962, Cl. 335-153.000.
Seeman, Bronislav: *See—*
Chevalier, Philippe; and Seeman, Bronislav, 3,976,878.
Seferian, Rupen B.; and Kaprielian, Roy M. Urea gypsum addition product and method. 3,976,467, Cl. 71-28.000.

Segal, Fred. Hole saw drill and arbor assembly. 3,976,387, Cl. 408-204.000.

Seiberlich, Richard R. Soft pretzel. 3,976,791, Cl. 426-19.000.

Seidel, Harold, to Bell Telephone Laboratories, Incorporated. R-C signal dividers and signal filters. 3,976,958, Cl. 333-6.000.

Seidman, Ady; Avrahami, Zohar; Sheinfux, Benjamin; and Grinberg, Jan, to Ramot University for Applied Research and Industrial Development Ltd. Channel electron multipliers. 3,976,905, Cl. 313-103.0CM.

Seifert, Clair F., to United States of America, Air Force. Separation spring actuator. 3,975,981, Cl. 89-1.00B.

Sekido, Satoshi; Ohhira, Tsukasa; Ikeda, Yutaka; and Yokoyama, Takao, to Matsushita Electric Industrial Co., Ltd. Nickel-zinc alkaline storage battery. 3,976,502, Cl. 136-6.0GC.

Sekiguchi, Hideto; Sone, Masao; and Sato, Mitsunori, to Japan Exlan Company Limited. Process for producing high shrinking acrylic fiber. 3,976,737, Cl. 264-182.000.

Sekiguchi, Kouichi; and Kobayashi, Akihiro. Dial device for a telephone set having a function of preventing toll dialing. 3,976,846, Cl. 179-18.0DA.

Sekiguchi, Yukichi, to Sanwa Seiki Mfg. Co. Modulator of an antiskid device for air brakes. 3,976,335, Cl. 303-21.00F.

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Sekisui Jushi Kabushiki Kaisha: *See—*
Nakane, Jun, 3,975,994.

Sekmakas, Kazys, to DeSoto, Inc. Water dispersible epoxy ether-aminoacrylate polymers. 3,976,615, Cl. 260-29.6HN.

Selnick, Lester L.: *See—*
Carnes, W. Robert, Jr.; Selnick, Lester L.; and Balogh, John, Jr., 3,976,198.

Senkbeil, Herman O.: *See—*
McGregor, Stanley D.; and Senkbeil, Herman O., 3,976,644.

Senters, Glenn A.: *See—*
Harrison, Charles W.; and Senters, Glenn A., 3,976,179.

Sergl, Josef: *See—*
Leistner, Werner; and Sergl, Josef, 3,976,904.

Service Equipment Design Co., Inc.: *See—*
Hauk, Thomas D.; and Carstensen, Kenneth J., 3,975,945.

Seymour, Theodore Joseph: *See—*
Geiger, Kenneth Daniel; Horvath, Steven Joseph; Niessen, Paul; and Seymour, Theodore Joseph, 3,976,405.

Seymour, William D. Returning tethered disc. 3,976,297, Cl. 273-95.00A.

Shabtai, Joseph: *See—*
Babai, David; and Shabtai, Joseph, 3,975,934.

Shackelford, Albert D.: *See—*
Holladay, John H.; and Shackelford, Albert D., 3,976,320.

Shaffer, Walter M., to Caterpillar Tractor Co. Power steering system for electric-drive lift truck. 3,976,158, Cl. 180-132.000.

Shale, Correll C.; and Cross, William G., to United States of America, Energy Research and Development Administration. Modified dry limestone process for control of sulfur dioxide emissions. 3,976,747, Cl. 423-244.000.

Shaner, Richard L.: *See—*
McCauley, Michael J.; and Shaner, Richard L., 3,975,920.

Shang, Jer-Yu; Bisson, Barry A.; and Wynkoop, Raymond, to Sun Ventures, Inc. Composition comprising a methyl phenol and an ether for gasoline fuels. 3,976,437, Cl. 44-56.000.

Shapiro, Eugene: *See—*
Crane, Jacob; and Shapiro, Eugene, 3,976,477.

Sharf, Joseph: *See—*
Crescas, Charles; Weisman, Sorrell; and Sharf, Joseph, 3,976,011.

Sharp, Brian William; Warburton, Dennis; Williams, Raymond Barry; and Wooldridge, Kenneth Robert Harry, to May & Baker Limited. Method of preventing coccidiosis with 3,5-dinitroaniline derivatives and veterinary compositions containing such derivatives. 3,976,786, Cl. 424-324.000.

Sharp Kabushiki Kaisha: *See—*
Miyata, Shizuo; Nakao, Yoshihide; Irihara, Koichi; Kawai, Ryoichi; and Nakao, Motokazu, 3,976,372.
Washizuka, Isamu; and Nakagawa, Hirohide, 3,976,994.

Shattuck, Richard E.: *See—*
Mueller Hans W.; Sherman, Howard F.; and Shattuck, Richard E., 3,976,181.

Shattuck, Ronald Corroalles, to Litton Systems, Inc. Programmable character display module. 3,976,906, Cl. 313-500.000.

Shaughnessy, Christopher M.; and Salathiel, William M., to Exxon Production Research Company. Method of consolidating subterranean formations using diluted resins. 3,976,140, Cl. 166-295.000.

Shaver, David M., to GTE Automatic Electric (Canada) Limited. Sense amplifier. 3,976,952, Cl. 330-30.00D.

Shaw & Slavsky, Inc.: *See—*
Slavsky, Robert J., 3,975,847.

Sheinfux, Benjamin: *See—*
Seidman, Ady; Avrahami, Zohar; Sheinfux, Benjamin; and Grinberg, Jan, 3,976,905.

Shell Oil Company: *See—*
Petty, Walter L., 3,976,602.
Roman, Steven A., 3,976,772.

Shelly, William A.: *See—*
Porter, Marion G.; Patterson, Garvin Wesley; Shelly, William A.; and Lemak, Nicolas S., 3,976,977.

Shen, John; and Chervenak, Michael C., to Hydrocarbon Research, Inc. Pretreatment of coal-derived liquid to improve magnetic separation of solids. 3,976,557, Cl. 208-10.000.

Shenandoah Manufacturing Co. Inc.: *See—*
Christophel, Reuben L., 3,976,243.

Shepherd, Alexander Turnbull: *See—*
Christie, Stuart Melville; and Shepherd, Alexander Turnbull, 3,976,859.

Shepherd, Geoffrey: *See—*
Dearden, Brian; and Shepherd, Geoffrey, 3,976,948.

Sheppard, John D.; and Thomas, David G., to United States of America, Energy Research and Development Administration. Water softening process. 3,976,569, Cl. 210-23.00F.

Sherman, Howard F.: *See—*
Mueller Hans W.; Sherman, Howard F.; and Shattuck, Richard E., 3,976,181.

Sherwood Medical Industries Inc.: *See—*
Ayres, Weldon R., 3,975,776.
Weichselbaum, Theodore E., 3,976,529.

Shields, James J.: *See—*
Smith, Jack R.; Burrows, Leonard H.; Heiser, Richard S.; Hertz, Richard J.; Pesavento, Joseph A.; Reuther, John F.; Shields, James J.; and Yannone, Robert A., 3,975,902.

Shigita, Syozo: *See—*
Ueno, Eichiro; Kawasaki, Hideo; and Shigita, Syozo, 3,976,425.

Shimizu, Miyuki: *See—*
Yamashita, Iwao; and Shimizu, Miyuki, 3,976,049.

Shimo, Shoji; and Atago, Takeshi, to Hitachi, Ltd. Secondary air flow rate control device for use in exhaust gas purifying device. 3,975,905, Cl. 60-290.000.

Shinohara, Hiroshi; Masunaga, Kunihiko; Kondo, Toshihito; and Ishiguro, Kazuhiko, to Toyota Jidosha Kogyo Kabushiki Kaisha. Method for producing a combustible gas by partial oxidation for use in internal combustion engines. 3,976,034, Cl. 123-1.00A.

Shiseido Co., Ltd.: *See—*
Tomita, Kenichi; Yanagi, Mitsuo; and Kobayashi, Toshiaki, 3,976,789.

Shuler, Bernard R., to American Air Filter Company, Inc. Ventilated ceiling construction. 3,975,995, Cl. 98-40.00D.

Shuster, Edward J.: *See—*
Hall, John B.; Tseng, Ching Y.; Vock, Manfred Hugo; Vinals, Joaquin; and Shuster, Edward J., 3,976,801.

Shwayder, Warren M. Saw and impact resistant member. 3,976,434, Cl. 29-191.200.

Sieling, Dale H.: *See—*
Dogliotti, Libera M.; Chalk, Ronald C.; Spano, Leo A.; and Sieling, Dale H., 3,976,466.

Siemens Aktiengesellschaft: *See—*
Bohlke, Gunther, 3,976,964.
Faber, Walter; and Schmieg, Gerhard, 3,976,850.
Harbauer, Werner, 3,976,353.
Holzermer, Gunter; and Schmitt, Gunter, 3,976,887.
Keller, Wolfgang, 3,976,536.
Leistner, Werner; and Sergl, Josef, 3,976,904.
Noske, Erich; and Grassme, Ulrich, 3,976,889.
Stangl, Franz, 3,975,808.
Trattner, Hermann; and Raab, Hans, 3,976,853.
Voigt, Hans; and Rupp, Gunther, 3,976,934.
Weyrich, Claus, 3,976,813.

Siemens Electrogerate GmbH: *See—*
Bischkopf, Hermann, 3,975,931.

Siepmann, Walter, to Vogt, Eugen. Valve housing and method of making the same. 3,975,810, Cl. 29-157.10R.

Signetics Corporation: *See—*
De Nora, Vittorio; and Polata, Bohumil, 3,976,512.

Silver, Marcus M. Spiral concentric-tube heat exchanger. 3,976,129, Cl. 165-154.000.

Silvern, David H.; and Minton, Stanley J., to Chicago Pneumatic Tool Company. Means for controlling flow instability in centrifugal compressors. 3,976,390, Cl. 415-53.00R.

Simmonds, Leonard B., to Westinghouse Electric Corporation. Magnetic wedge and the process of making said wedge. 3,976,902, Cl. 310-214.000.

Simmons, Clyde A.: *See—*
Lunsford, Leslie E.; and Simmons, Clyde A., 3,975,930.
Lunsford, Leslie E.; and Simmons, Clyde A., 3,976,426.

Simmons, Gerald P., to Caterpillar Tractor Co. Self aligning collect for machine tools. 3,975,984, Cl. 90-11.00D.

Simmons, Reginald John, to AMP Incorporated. Electrical tab receptacle. 3,976,348, Cl. 339-74.00R.

Simpson, James L.: *See—*
Kompare, John W.; Potts, John C.; and Simpson, James L., 3,976,460.

Sims, Anker V., to Thermo-Mist Company. Sulfur removal from high temperature fuel gas generated by gasification. 3,976,446, Cl. 55-73.000.

Singer Company, The: *See—*
Allen, John Wesley; and Waiwood, William P., 3,976,019.
Eisenberg, Robert M.; and Myles, Walter E., 3,975,834.
Reichman, Ronald, 3,975,835.
Stella, Carl; and Costello, Edward, 3,976,869.

Singer, Leonard Sidney: *See—*
Lewis, Irwin Charles; McHenry, Edgar Ronald; and Singer, Leonard Sidney, 3,976,729.

Sirgo, Valdeko Harry: *See—*
Babinski, John Paul; Bertelsen, Bruce Irving; Raacke, Karl Heinz; Sirgo, Valdeko Harry; and Townsend, Clarence Jay, 3,976,330.

Skinner, Mark: *See—*
Ramser, Forrest L.; and Skinner, Mark, 3,976,032.

Slaton, Jack H.; and Wolfe, Halley, to United States of America, Navy. Underwater target detection apparatus. 3,976,968, Cl. 340-3.00D.
Slattery Manufacturing (Proprietary) Ltd.: *See—*
Rodger, Alexander J., 3,975,890.
Rodger, Alexander J., 3,976,143.
Slavsky, Robert J., to Shaw & Slavsky, Inc. One-piece clip. 3,975,847, Cl. 40-11.00R.
Sleptsov, Vasily Mikhailovich: *See—*
Dudko, Daniil Andreevich; Samsonov, Grigory Valentinovich; Maximovich, Boleslav Ivanovich; Zelenin, Vitaly Ivanovich; Klimanov, Alexandr Sergeevich; Potseluiko, Vladimir Nikolaevich; Trunov, Gennady Vasilievich; and Sleptsov, Vasily Mikhailovich, 3,976,481.
Small, Byron Lee: *See—*
Besnyo, George Frank; and Small, Byron Lee, 3,975,883.
Smalley, Ned J., to Owens-Illinois, Inc. Easy-open, tamper-indicating closure. 3,976,215, Cl. 215-253.000.
Smeby, Robert Rudolph: *See—*
Bumpus, Francis Merlin; Khosla, Mahesh Chandra; and Smeby, Robert Rudolph, 3,976,770.
Smilg, Benjamin: *See—*
Isaacson, Max; and Smilg, Benjamin, 3,975,863.
Smith, Alan; and Larner, Ronald W., to Glaxo Laboratories Limited. Cephalosporins. 3,976,546, Cl. 195-29.000.
Smith, C. Perry. Ortho-activating method and apparatus. 3,975,825, Cl. 32-14.00R.
Smith, Carl H., to Auto Research Corporation. Electronic pressure cycle indicator. 3,976,989, Cl. 340-270.000.
Smith, David Allen: *See—*
Hickin, Charles Wyndham Robinson; and Smith, David Allen, 3,976,991.
Smith, David R.; and Zelinski, Robert P., to Phillips Petroleum Company. Process and catalyst for production of rubbery polymers. 3,976,630, Cl. 526-335.000.
Smith, Ernest S.: *See—*
Ericson, Kenneth R.; and Smith, Ernest S., 3,976,224.
Smith, Haldon J., to Raymond Lee Organization, Inc., The, a part interest. Oil well rate metering method. 3,975,941, Cl. 73-15.00R.
Smith, Homer R.: *See—*
Jacobsen, Stephen C.; Smith, Homer R.; and Koncher, Tawny R., 3,976,576.
Smith, Jack R.; Burrows, Leonard H.; Heiser, Richard S.; Hertz, Richard J.; Pesavento, Joseph A.; Reuther, John F.; Shields, James J.; and Yannone, Robert A., to Westinghouse Electric Corp. Local maintenance controller for gas turbine power plants having a primary control system. 3,975,902, Cl. 60-39.250.
Smith Kline & French Laboratories, Inc.: *See—*
Lee, Richard Martin; and Sach, George Sidney, 3,976,777.
Smith, Richard L.; and Mosher, Peter J., to Scans Associates, Inc. Method and apparatus for reproducing operating conditions in induced flow devices. 3,975,953, Cl. 73-118.000.
Smith, Robert A. Magnetic game apparatus. 3,976,296, Cl. 273-85.00A.
Smith, William E.; and Bowden, Charles J., to General Signal Corporation. System for providing auxiliary power. 3,975,908, Cl. 60-405.000.
SmithKline Corporation: *See—*
Berkoff, Charles E.; Hill, David T.; and Loev, Bernard, 3,976,633.
Hoover, John R. E.; and Yu-Wen Jen, Timothy, 3,976,641.
Kaiser, Carl; and Ross, Stephen T., 3,976,694.
Kaiser, Carl; and Ross, Stephen R., 3,976,695.
Smulders, Walter Henricus Maria Magdala: *See—*
Enzlin, Theodoor Henri; and Smulders, Walter Henricus Maria Magdala, 3,977,020.
Snam Progetti S.p.A.: *See—*
Palladino, Nicola; Mazzei, Marcello; Bacchin, Paolo; and Marconi, Walter, 3,976,621.
Sniezek, Joseph T.: *See—*
Wilson, George S.; and Sniezek, Joseph T., 3,976,150.
Snyder, Donald L.: *See—*
Brunnett, Carl J.; Cox, Jerome R., Jr.; Snyder, Donald L.; and Mattson, Rodney A., 3,976,885.
Societa Italiana Elettronica S.p.A.: *See—*
Banfi, Antonio, 3,976,893.
Banfi, Antonio, 3,976,933.
Societe a Responsabilite Limitee dite SERAM: *See—*
Mennesson, Bernard Rene, 3,976,159.
Societe Anonyme de Vehicules Industriels et d'Equipements Mecaniques SAVIEM: *See—*
Baguelin, Yves, 3,976,042.
Societe Anonyme Dite: J. Sabes & Cie: *See—*
Sabes, Jean, 3,976,189.
Societe Anonyme Francaise du Ferodo: *See—*
Fieni, Walter, 3,976,305.
Societe Anonyme: Poclain: *See—*
Fillion, Pierre C.; and Vicentini, Gilles P., 3,976,333.
Societe d'Assistance Technique pour Produits Nestle S.A.: *See—*
Gasser, Rupert J.; and Franklin, James G., 3,976,804.
Societe des Aciers Fins de l'Est: *See—*
Sartorius, Guy, 3,976,238.
Societe d'Etudes et de Realisations Scientifiques en Abrege: *See—*
Beaudet, Camille, 3,976,646.
Societe d'Etudes Scientifiques et Industrielles l'Ile-de-France: *See—*
Thominet, Michel Leon, 3,976,780.
Societe dite: Automobiles Peugeot: *See—*
Henault, Claude, 3,976,039.
Societe Nationale d'Etude et de Construction de Moteurs d'Aviation: *See—*
Hallinger, Claude Christian; and Kervistin, Robert, 3,975,901.
Hoch, Rene Gerard; and Julliand, Michel Henri, 3,976,160.
Sola Basic Industries, Inc.: *See—*
Krubsack, Kim R., 3,976,424.
Solartron Electronic Group Limited, The: *See—*
Ryder, Alan, 3,976,896.
Solis S.r.l.: *See—*
Furia, Edoardo, 3,975,924.
Sone, Masao: *See—*
Sekiguchi, Hideto; Sone, Masao; and Sato, Mitsunori, 3,976,737.
Sony Corporation: *See—*
Hamada, Osamu, 3,976,955.
Ishigaki, Yoshio; and Okada, Takashi, 3,976,951.
Ishitani, Akiyasu, 3,977,017.
Matsushita, Takeshi; and Kawana, Yoshiyuki, 3,977,019.
Nakamura, Shoichi; and Naito, Noriaki, 3,977,023.
Yanagisawa, Yuzuru; Ohgoshi, Akio; Yamanaka, Akira; and Muramoto, Shoichi, 3,976,907.
Sorice, Edward L.; and Jones, Dennis G., to Kennametal Inc. Cutting insert, especially for milling operations. 3,975,809, Cl. 29-95.00R.
Sosnay, Alan Jay. Orthodontic torquing system. 3,975,825, Cl. 32-14.00A.
Souslin, Richard E., to Boeing Company, The. Aerial refueling apparatus. 3,976,100, Cl. 137-614.030.
Southwire Company: *See—*
Miller, Vernon J., 3,976,119.
Sowa, Edmund S., to United States of America, Energy Research and Development Administration. Magnetic latch trigger for inherent shutdown assembly. 3,976,540, Cl. 176-36.00R.
Sowa, Edmund S., to United States of America, Energy Research and Development Administration. Temperature actuated shutdown assembly for a nuclear reactor. 3,976,543, Cl. 176-86.00R.
Spaeth, Irvin J., to Evans Products Company. Railway brake beam head. 3,976,170, Cl. 188-236.000.
Spagnolo, Joseph. Beverage metering and dispensing device. 3,976,222, Cl. 222-70.000.
Spano, Leo A.: *See—*
Dogliotti, Libera M.; Chalk, Ronald C.; Spano, Leo A.; and Sieling, Dale H., 3,976,466.
Spector, Sidney, to Hoffmann-La Roche Inc. Chlorpromazine assay. 3,976,763, Cl. 424-1.500.
Speer, Billy L., to Dayco Corporation. Belt tensioning apparatus. 3,975,965, Cl. 74-242.11R.
Spencer, Byron Arthur Thomas, to Lucas Industries Limited. Transmission devices with no-back brakes. 3,976,173, Cl. 192-8.00R.
Spendlove, Ray E. Tubing connector apparatus and method. 3,976,311, Cl. 285-12.000.
Sperry, Charles R., to Instapak Corporation. System for dispensing polyurethane and the like. 3,976,230, Cl. 222-146.0HE.
Sperry Rand Corporation: *See—*
Sabnis, Ajit V., 3,976,339.
Spier, Raymond E.: *See—*
McAleer, William J.; Spier, Raymond E.; and Schlabach, Abner J., 3,976,547.
Spinner, Georg. Coaxial plug-type connection. 3,976,352, Cl. 339-177.00R.
Spraggins, Robert L.: *See—*
Weinheimer, Alfred J.; and Spraggins, Robert L., 3,976,679.
Sprague Electric Company: *See—*
Peck, David B.; and Geissler, Edward C., 3,976,922.
Spry, Donald J.: *See—*
Miavecz, Joseph L.; Spry, Donald J.; and Wojcik, David S., 3,976,912.
Spurling, John E.; Hodek, Jiri G.; and Kessels, Edward J., to International Electronic Research Corporation. Slide guide retainer. 3,975,805, Cl. 24-248.0PC.
Square D Company: *See—*
Anger, Ernest G., 3,976,987.
Stach, Kurt: *See—*
Leinert, Herbert; Popelak, Alfred; Stach, Kurt; Bartsch, Wolfgang; and Dietmann, Karl, 3,976,779.
Stadeker, Carl. Life preserver baton. 3,975,785, Cl. 9-319.000.
Stahel, Alwin J., to Questor Corporation. Baby carrier and seat. 3,976,328, Cl. 297-377.000.
Stahl, Gunter. Reciprocating stratified charge internal combustion engine and mixture formation process. 3,976,038, Cl. 123-32.0SP.
Stahlecker, Fritz, to Stahlecker, Fritz; and Stahlecker, Hans. Open-end spinning machine with means for supplying a sliver. 3,975,895, Cl. 57-58.950.
Stahlecker, Hans: *See—*
Stahlecker, Fritz, 3,975,895.
Stallinga, Robert J., Jr. High fidelity sound reproduction system. 3,976,838, Cl. 179-1.00E.
Stamicarbon B.V.: *See—*
Alfenaar, Marinus; and Cremers, Freddie J., 3,976,755.
van der Molen, Theodorus J.; Meijer, Louis A.; and Joosen, Joos D., 3,976,631.
Standard Manifold Company: *See—*
Fleischmann, Lester K.; Kenney, William J.; and Fleischmann, David L., 3,976,183.
Standard Oil Company: *See—*
Loder, Wallace R., Jr.; Fay, Philip S.; and Veatch, Franklin, 3,976,439.

Loder, Wallace R., Jr.; Fay, Philip S.; and Veatch, Franklin, 3,976,440.

Standard Oil Company (Indiana): *See—*
Blenkarn, Kenneth A.; and Greenfield, William D., 3,976,021.
Egli, Ernst; and Thomas, Larry A., 3,976,419.
Feinstein, Allen; and Fields, Ellis K., 3,976,665.
Wilder, Lawrence B., 3,976,139.

Stangl, Franz, to Siemens Aktiengesellschaft. Method for producing a key which is to be actuated by way of a pressure force directioned and dimensioned in a certain manner. 3,975,808, Cl. 29-25.350.

Starkweather, Howard Warner, Jr.: *See—*
Hammer, Clarence Frederick; and Starkweather, Howard Warner, Jr., 3,976,720.

Starmer, Philip H., to B.F. Goodrich Company, The. Vulcanizable compositions containing diene/nitrile polymers having active halogen sites. 3,976,625, Cl. 260-79.50P.

Stauffer Chemical Company: *See—*
Arneklev, Duane R.; Pallos, Ferenc M.; and Gaughan, Edmund, 3,976,469.
Baker, Don R., 3,976,470.
Toy, Arthur D. F.; and Uhing, Eugene H., 3,976,690.

Stearns, Charles F., to United Technologies Corporation. Fuel control. 3,975,903, Cl. 60-39.270.

Stece - AB Industrifjadrar: *See—*
Farlind, Stig Axel Goran, 3,975,800.

Steenken, Heinz W. L.; and Luth, Detlef G. H., to Howaldtswerke-Deutsche Werft Aktiengesellschaft Hamburg und Kiel. Ship and pier for extraction of valuable materials from the sea bed. 3,975,841, Cl. 37-54.000.

Steinbichler, Hans: *See—*
Rottenkolber, Hans; and Steinbichler, Hans, 3,976,380.

Steiner, Alois, to Ruti Machinery Works Ltd. Device for filling yarn bobbins on the shuttles of a traveling wave loom. 3,976,105, Cl. 139-436.000.

Steingroever, Erich, to Elektro-Physik, Hans Nix & Dr.-Ing. E. Steingroever KG. Apparatus for measuring the internal field intensity of magnet bodies. 3,976,935, Cl. 324-34.00R.

Steinmetz, Michael J.: *See—*
Criscimagna, Tony N.; and Steinmetz, Michael J., 3,976,992.

Stella, Carl; and Costello, Edward, to Singer Company, The. Solid state resolver coordinate converter unit. 3,976,869, Cl. 235-189.000.

Stellbrink, Udo: *See—*
Hettich, Anton; Stellbrink, Udo; and Sundermeier, Gunter, 3,975,791.

Stephan, Guy: *See—*
Le Floch, Albert; and Stephan, Guy, 3,976,957.

Stephens, Sidney M.: *See—*
Ragsdale, Philip W.; and Stephens, Sidney M., 3,976,030.

Sterling Drug Inc.: *See—*
Albertson, Noel F.; and Michne, William F., 3,976,653.

Sterling, Kermit Karold, to Texas Instruments Incorporated. AC regulator. 3,976,931, Cl. 321-18.000.

Stinson, Willis David, Jr.: *See—*
Chau, Yuk Bun; and Stinson, Willis David, Jr., 3,976,940.

Stiteler, Fred Zwald; and Donohue, James Phillip, to Combustion Engineering, Inc. Secondary coolant purification system with demineralizer bypass. 3,976,541, Cl. 176-37.000.

Stockman, John H. Method for engraving graphical representations upon workable materials. 3,975,983, Cl. 90-11.00C.

Stockman, John H. Master for engraving graphical representations upon workable materials. 3,975,985, Cl. 90-62.00R.

Stoddard, Leo H. Serpentine linch pin. 3,975,979, Cl. 85-8.300.

Stoermer, William F., to Henny Penny Corporation. Safety apparatus for a pressure cooker. 3,976,218, Cl. 220-316.000.

Stoll, Max: *See—*
Winter, Max; Gautschi, Fritz; Flament, Ivon; Stoll, Max; and Goldman, Irving M., 3,976,802.

Storage Technology Corporation: *See—*
Derby, Howard L.; Epina, August P.; Olmsted, Dennis R.; Platter, Sanford; and Herger, Zoltan L., 3,975,789.

Stowik, William: *See—*
Kaiser, Kenneth L.; and Stowik, William, 3,975,794.

Strauven, Kurt, to Wasser-Sand-Forschungs-und Vertriebsgesellschaft mbH. Apparatus for bonding paper or foil webs on substrates. 3,976,533, Cl. 156-497.000.

Street, Robert W.: *See—*
Herber, John F.; Street, Robert W.; and Richard, William R., Jr., 3,976,585.

Striebeck, Achim: *See—*
Hoffmann, Gunthard; and Striebeck, Achim, 3,976,666.

Strunk, Richard J.; and Hubbard, Winchester Loomis, to Uniroyal Inc. (Hydrocarbylphenylsulfonyl)alkyltrimethylstannanes. 3,976,672, Cl. 260-429.700.

Stuart, Roger Alexander: *See—*
Birch, William; Stuart, Roger Alexander; Facer, Robert Ian; and Durston, John Graham, 3,975,879.

Sugi, Norio: *See—*
Kaji, Hidehiko; Matsumoto, Takeshi; Sugi, Norio; Ikenaga, Atsuo; Iwata, Shoichi; and Tomikawa, Masami, 3,976,612.

Sugiura, Susumu: *See—*
Kawakubo, Kazuo; Takahashi, Isao; and Sugiura, Susumu, 3,976,373.

Sullins, John K., to Canton Textile Mills, Inc. Liquid aeration device. 3,976,575, Cl. 210-220.000.

Sumitomo Chemical Company, Limited: *See—*
Matsunaga, Hiroomi; Tsuji, Kozo; and Saito, Teruo, 3,976,605.
Mori, Atsuo; Tsuji, Kozo; and Kitamura, Shuji, 3,976,819.

Sumitomo Electric Indusries, Ltd.: *See—*
Hirai, Akiyoshi; Yamamoto, Masachika; and Kimura, Ryoichi, 3,976,167.

Sumitomo Metal Industries, Ltd.: *See—*
Fujino, Nobukatsu; Yamanaka, Kazuo; and Harada, Takeo, 3,976,513.

Summit Metal Fabricating, Inc.: *See—*
Gerlach, Hans W., 3,976,002.

Sun Oil Company of Pennsylvania: *See—*
Holmes, Timothy L.; and Thompson, Sheldon L., 3,976,713.

Sun Ventures, Inc.: *See—*
Shang, Jer-Yu; Bisson, Barry A.; and Wynkoop, Raymond, 3,976,437.
Thompson, Robert M., 3,976,669.

Sundermeier, Gunter: *See—*
Hettich, Anton; Stellbrink, Udo; and Sundermeier, Gunter, 3,975,791.

Sunds Aktiebolag: *See—*
Larsson, Bo Lennart Henning, 3,976,003.

Sundvall, Bror Christer Ingemar: *See—*
Carlnas, Bengt Erik; and Sundvall, Bror Christer Ingemar, 3,976,089.

Sunstein, David E. Cathode-ray tube image presentation system of the indexing type and timing system useful therewith. 3,977,022, Cl. 358-67.000.

Superconducting Technology, Inc.: *See—*
Hesterman, Victor W., 3,976,938.

Sutara, Steve J., to PPG Industries, Inc. Method and apparatus for bending glass sheets. 3,976,462, Cl. 65-107.000.

Suzuki, Nobuo, to Technical Incorporated. Operating system in a magnetic tape reproducer and recorder. 3,976,263, Cl. 242-201.000.

Suzuki, Shigeto, to Chevron Research Company. Sulfur oxidation of olefins to ketones. 3,976,699, Cl. 260-586.00R.

Suzuki, Takashi; and Naito, Susumu, to Mitsubishi Gas Chemical Company, Inc. Process for producing alkylphenols. 3,976,702, Cl. 260-621.00R.

Suzuki, Yoshihisa, to Toyoda Automatic Loom Works, Ltd.; and Daiwa Spinning Co., Ltd. Vibration and sound dampening means. 3,975,894, Cl. 57-58.890.

Svatek, Thomas A., to Polaroid Corporation. Ever-ready camera case. 3,977,013, Cl. 354-75.000.

Sweeney, Doris; and Lee, Mary Ellen. Mock owl display. 3,976,807, Cl. 428-16.000.

Syntex (U.S.A.) Inc.: *See—*
Beard, Colin C., 3,976,654.

Szpitalak, Wesley J., to Continental Can Company, Inc. Reciprocating pusher for transferring articles between conveyors. 3,976,187, Cl. 198-24.000.

Szymalak, Edward: *See—*
Powers, Robert W.; Mitoff, Stephan P.; and Szymalak, Edward, 3,976,554.

Taber, George J., to Tractioneers, Inc. Footwear. 3,975,839, Cl. 36-86.000.

Tagawa, Hiroaki, to Japan Atomic Energy Research Institute. Process for the production of uranium trifluoride. 3,976,750, Cl. 423-258.000.

Taguchi, Seiichi: *See—*
Ohtsuka, Shyuichi; and Taguchi, Seiichi, 3,977,009.

Takahashi, Isao: *See—*
Kawakubo, Kazuo; Takahashi, Isao; and Sugiura, Susumu, 3,976,373.

Takahashi, Yasuo; and Okudaira, Sadao, to Asahi Kogaku Kogyo Kabushiki Kaisha. Retrofocus type wide angle lens of low F-number. 3,976,367, Cl. 350-214.000.

Takahashi, Yasuro; and Yamamoto, Hisao, to Mitsubishi Jukogyo Kabushiki Kaisha. Method and apparatus for burning fuels. 3,976,420, Cl. 431-10.000.

Takaishi, Naotake; Inamoto, Yoshiaki; and Tsuchihashi, Kiyoshi, to Kao Soap Co., Ltd. Process for the preparation of tricyclo [5.3.1.$0^{3,8}$]undecane. 3,976,706, Cl. 260-666.0PY.

Takaishi, Naotake; Inamoto, Yoshiaki; and Tsuchihashi, Kiyoshi, to Kao Soap Co., Ltd. Process for the preparation of tricyclo [5.3.1.$0^{3,8}$] undecane. 3,976,707, Cl. 260-666.0PY.

Takaishi, Naotake; Inamoto, Yoshiaki; and Tsuchihashi, Kiyoshi, to Kao Soap Co., Ltd. Process for the preparation of tricyclo[5.3.1.$0^{3,8}$]undercane. 3,976,708, Cl. 260-666.0PY.

Takaishi, Naotake; Inamoto, Yoshiaki; and Tsuchihashi, Kiyoshi, to Kao Soap Co., Ltd. Process for the preparation of tricyclo[5.3.1.$0^{3,8}$]undecane. 3,976,709, Cl. 260-666.0PY.

Takaishi, Naotake; Inamoto, Yoshiaki; and Tsuchihashi, Kiyoshi, to Kao Soap Co., Ltd. Process for the preparation of tricyclo[5.3.1.$0^{3,8}$]undecane. 3,976,710, Cl. 260-666.0PY.

Takaishi, Naotake; Inamoto, Yoshiaki; and Tsuchihashi, Kiyoshi, to Kao Soap Co., Ltd. Process for the preparation of tricyclo[5.3.1.$0^{3,8}$]undecane. 3,976,711, Cl. 260-666.0PY.

Takaishi, Naotake; Inamoto, Yoshiaki; and Tsuchihashi, Kiyoshi, to Kao Soap Co., Ltd. 2,4-Exo-ethanobicyclo (3.3.1)nonane. 3,976,712, Cl. 260-666.0PY.

Takasawa, Seigo: *See—*
Nara, Takashi; Takasawa, Seigo; Okachi, Ryo; Kawamoto, Isao; Yamamoto, Mitsuyoshi; Sato, Seiji; and Sato, Tomoyasu, 3,976,768.

Takeda, Tetuo: *See—*
Matsukura, Kameo; Watanabe, Kunio; Hashimoto, Yoshio; Nakayama, Masatoki; Nakasugi, Hajime; and Takeda, Tetuo, 3,976,514.

Takei, Haruo: *See—*
Hinata, Masanao; Takei, Haruo; Sato, Akira; and Ikeda, Tadashi, 3,976,492.

Takida, Hiroshi; and Akamatu, Yoshimi, to Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha. Molding made of hydrolyzed ethylene-vinyl acetate copolymer. 3,976,618, Cl. 260-40.00R.

Tallent, Othar K., to United States of America, Energy Research and Development Administration. Method for dissolving plutonium dioxide. 3,976,775, Cl. 423-251.000.

Tamai, Yasuo: *See—*
Honjo, Satoru; Tamai, Yasuo; and Tsuji, Nobuo, 3,976,808.

Tamura, Masahiko; Iwama, Kiyonori; Yoshimi, Toshikazu; and Oyaba, Takashi, to Pioneer Electronic Corporation. Piezoelectric electro-acoustic diaphragm transducer with composite resilient backing. 3,976,897, Cl. 310-8.200.

Tanahashi, Kunio; and Nariai, Yukitoshi, to American Cyanamid Company. Process for producing antistatic acrylic fibers. 3,976,738, Cl. 264-182.000.

Tanaka, Keiji: *See—*
Ando, Yujiro; Ohara, Katsunobu; and Tanaka, Keiji, 3,976,484.

Tanaka, Susumu: *See—*
Kurita, Takaji; and Tanaka, Susumu, 3,976,375.

Tapco International, Inc.: *See—*
Jandrasi, Frank J.; and Purvis, Howard A., 3,976,094.

Tarter, David A.; and Readnour, Jack L., to United States of America, Air Force. Interstage bleed assembly. 3,976,394, Cl. 415-144.000.

Tate, David P.: *See—*
Halasa, Adel F.; and Tate, David P., 3,976,628.

Taylor, John Richardson: *See—*
Thompson, Peter; and Taylor, John Richardson, 3,976,286.

Technical Incorporated: *See—*
Suzuki, Nobuo, 3,976,263.

Technicon Instruments Corporation: *See—*
Croslin, Michael E., 3,975,960.

Tekeuchi, Masato: *See—*
Nakajima, Fumito; Tekeuchi, Masato; Matsuda, Shimpei; Uno, Shigeo; Mori, Toshikatsu; Watanabe, Yoshihisa; and Imanari, Makoto, 3,976,745.

Teldix GmbH: *See—*
Gerstenmeier, Jurgen; Korasiak, Wolfgang; Morath, Thomas; and Muller, Hans, 3,976,860.

Telefonaktiebolaget L M Ericsson: *See—*
Aman, Kurt Arvid, 3,976,972.
Danell, Curt; Holmer, Bo Gunnar; and Rodhe, Peder Magnus, 3,976,831.

Telephonax, Inc.: *See—*
Catto, Kenneth A., 3,976,236.

Teletype Corporation: *See—*
Berry, James M.; Hauser, Anthony J.; Knuth, Kurt E.; and Ollendick, Gary B., 3,977,007.
Haak, Gary R., 3,976,990.

Tenconi, Riccardo. Feed device for circular knitting machines of the type manufacturing open fabric. 3,975,926, Cl. 66-133.000.

Tenneco Inc.: *See—*
Balluff, Robert N., 3,975,826.
Barth, Benedict G.; Willette, Earl G.; and Barosko, John M., 3,975,986.

Teppo, Edward A.: *See—*
Bottka, Nicholas; Teppo, Edward A.; and Rehn, Victor L., 3,976,873.

Terenina, Alexandra Dmitrievna: *See—*
Kalnin, Igor Martynovich; Tsirlin, Beniamin Lvovich; Bukhter, Elena Zalmanovna; Terenina, Alexandra Dmitrievna; Eremkina, Galina Ivanovna; Poteiko, Andrei Ivanovich; and Breslov, Khanon Yakovlevich, 3,976,395.

Terstegge, Theodore E. Firearm with accurizing means. 3,975,982, Cl. 89-163.000.

Texaco Inc.: *See—*
Bennett, Richard H.; Brockington, James W.; and Line, Lloyd E., Jr., 3,976,759.
Bialy, Jerzy J.; and Weetman, David G., 3,976,441.
Bousaid, Issam S., 3,976,137.
Canup, Robert E.; and Burton, Aubrey T., 3,976,043.
Harrison, Charles W.; and Senters, Glenn A., 3,976,179.
Kolaian, Jack H.; Patterson, John A.; and Ward, Frank K., 3,976,682.
Kuntschik, Lawrence F.; and Rigdon, Orville W., 3,976,697.
Mitchell, Edward, 3,976,035.
Paull, Peter L.; and Schlinger, Warren G., 3,976,442.
Paull, Peter L.; and Schlinger, Warren G., 3,976,443.

Texas Instruments Incorporated: *See—*
Adams, Anthony L.; and Moore, Troy D., 3,976,329.
Catagnus, Philip C.; and Baker, Charles T., 3,977,018.
Cipher, John A.; and Lorang, Malcolm M., 3,976,943.
Cochran, Michael J., 3,976,975.
Meyer, John V., 3,976,600.
Sterling, Kermit Karold, 3,976,931.

Textron, Inc.: *See—*
Gapp, Roland Howard; Toosky, Rahmatollah Fakhri; and York, Ira Bill Lee, 3,975,786.
Moertel, George B., 3,975,801.
Moertel, George B., 3,975,802.
Wenzel, Robert H., 3,976,928.

Theis, James V., Jr., to Hollymatic Corporation. Pressurized gas engine. 3,976,389, Cl. 415-25.000.

Theodore, Ares N.: *See—*
Labana, Santokh S.; and Theodore, Ares N., 3,976,715.
Labana, Santokh S.; and Theodore, Ares N., 3,976,716.
Labana, Santokh S.; and Theodore, Ares N., 3,976,717.
Labana, Santokh S.; and Theodore, Ares N., 3,976,718.
Labana, Santokh S.; and Theodore, Ares N., 3,976,719.

Thermex, Inc.: *See—*
Klingler, Josef F., 3,976,740.

Thermo Electron Corporation: *See—*
Bornhorst, Walter J.; Coleman, Steven J.; and O'Brien, James W., 3,976,080.
Lambert, Jack R., 3,976,216.

Thermo-Mist Company: *See—*
Sims, Anker V., 3,976,446.

Theurer, Josef: *See—*
Plasser, Franz; Theurer, Josef; and Folser, Karl, 3,976,142.

Thillainayagam, Velauthar Kopalapillai: *See—*
Larner, Douglas Stanley; Thillainayagam, Velauthar Kopalapillai; Blackmore, Ronald William; and Hill, Barry Michael Ernest, 3,976,835.

Thillays, Jacques Claude, to U.S. Philips Corporation. Opto-electronic photocoupling device and method of manufacturing same. 3,976,877, Cl. 250-227.000.

Thomas, David G.: *See—*
Sheppard, John D.; and Thomas, David G., 3,976,569.

Thomas, Larry A.: *See—*
Egli, Ernst; and Thomas, Larry A., 3,976,419.

Thomas, Mary R.; Lalk, Robert H.; Evani, Syamalarao; and Schmidt, Donald L., to Dow Chemical Company, The. Magnetic tape and process of making a magnetic tape. 3,976,822, Cl. 428-500.000.

Thominet, Michel Leon, to Societe d'Etudes Scientifiques et Industrielles l'Ile-de-France. Methods of protection against emesis in mammals by administration of a 3-alkoxy-thianaphthene-2-carboxamide. 3,976,780, Cl. 424-275.000.

Thompson, Bruce R.: *See—*
Rothauser, Charles; and Thompson, Bruce R., 3,975,833.

Thompson, George H. B., to International Standard Electric Corporation. Variable optical coupler. 3,976,358, Cl. 350-96.00C.

Thompson, Kenneth; and Ihde, Richard C., to U.S. Plywood-Champion Papers Inc. Method of extruding thermoplastic films. 3,976,527, Cl. 156-244.000.

Thompson, Peter; and Taylor, John Richardson, to GR-Stein Refractories Limited. Metallurgical lances. 3,976,286, Cl. 266-225.000.

Thompson, Robert M., to Sun Ventures, Inc. Tertiary diamides. 3,976,669, Cl. 260-404.500.

Thompson, Sheldon L.: *See—*
Holmes, Timothy L.; and Thompson, Sheldon L., 3,976,713.

Thomson-CSF: *See—*
Dubois, Jean Claude; Zann, Annie; and Lavenu, Jean Claude, 3,976,591.

Thorn, Lawrence B.: *See—*
Dreitzler, David R.; and Thorn, Lawrence B., 3,975,942.

Thornell, Lennart: *See—*
Eriksson, Leif; and Thornell, Lennart, 3,976,920.

Tidwell, James H. Physical coordination training device. 3,976,058, Cl. 128-25.00R.

Tilby, Sydney Edward; Mason, William C. W.; and Hodge, Donald William, to Canadian Cane Equipment Ltd. Sugarcane separation. 3,976,498, Cl. 127-2.000.

Tilby, Sydney Edward, to Canadian Cane Equipment Ltd. Method for preparing sugarcane stalks for subsequent processing. 3,976,499, Cl. 127-42.000.

Toda, Hiromi: *See—*
Ariyoshi, Junji; Ohnishi, Akira; Toda, Hiromi; Kunimori, Kametaro; and Nakao, Mitsuyoshi, 3,976,824.

Tokyo Shibaura Electric Co., Ltd.: *See—*
Hirasawa, Masataka, 3,976,984.

Tomcavage, Joseph Richard, to RCA Corporation. Wire mesh cathode. 3,976,909, Cl. 313-341.000.

Tomikawa, Masami: *See—*
Kaji, Hidehiko; Matsumoto, Takeshi; Sugi, Norio; Ikenaga, Atsuo; Iwata, Shoichi; and Tomikawa, Masami, 3,976,612.

Tomita, Kenichi; Yanagi, Mitsuo; and Kobayashi, Toshiaki, to Shiseido Co., Ltd. Cosmetic composition. 3,976,789, Cl. 424-365.000.

Tomlinson Industries, Inc.: *See—*
Basel, Donald R.; and Kawolics, Raymond P., 3,976,277.

Toosky, Rahmatollah Fakhri: *See—*
Gapp, Roland Howard; Toosky, Rahmatollah Fakhri; and York, Ira Bill Lee, 3,975,786.

Topolski, Alvin S.: *See—*
Corbett, Michael J.; and Topolski, Alvin S., 3,976,301.

Torance, William Robert Lincoln. Razors and blade cartridge therefore. 3,975,820, Cl. 30-47.000.

Toriello, Danti, to Meridian Corporation. Acupuncture needle unit. 3,976,078, Cl. 128-329.00A.

Toriyama, Haruhiko: *See—*
Makino, Takayuki; and Toriyama, Haruhiko, 3,975,948.

Torpey, Wilbur N., to Autotrol Corporation. Method of wastewater treatment. 3,976,568, Cl. 210-16.000.

Toussaint, Henry, to Le Nickel. Continuously producing and recovering metallic chlorides. 3,976,760, Cl. 423-493.000.

Townsend, Clarence Jay: *See—*
Babinski, John Paul; Bertelsen, Bruce Irving; Raacke, Karl Heinz; Sirgo, Valdeko Harry; and Townsend, Clarence Jay, 3,976,330.
Toy, Arthur D. F.; and Uhing, Eugene H., to Stauffer Chemical Company. Process for preparing alkane bis-dihalophosphines. 3,976,690, Cl. 260-543.00P.
Toyama, Seiji; and Yoshikawa, Kazuo, to Fuji Photo Optical Co., Ltd. Optical system for color television camera. 3,976,363, Cl. 350-173.000.
Toyo Kogyo Co., Ltd.: *See—*
Muroki, Takumi; and Hayashida, Motoyuki, 3,976,036.
Toyo Valve Co., Ltd.: *See—*
Okano, Masao, 3,976,478.
Toyoda Automatic Loom Works, Ltd.: *See—*
Suzuki, Yoshihisa, 3,975,894.
Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
Hirai, Akiyoshi; Yamamoto, Masachika; and Kimura, Ryoichi, 3,976,167.
Makino, Takayuki; and Toriyama, Haruhiko, 3,975,948.
Sasaki, Yoshio, 3,976,406.
Shinohara, Hiroshi; Masunaga, Kunihiko; Kondo, Toshihito; and Ishiguro, Kazuhiko, 3,976,034.
Trachte, Kurt; Willingshofer, Walter; and Kleinschmit, Einhard, to Daimler-Benz Aktiengesellschaft. Slide/rubber torsion-bearing support for the absorption of axial and radial forces. 3,976,338, Cl. 308-26.000.
Tractioneers, Inc.: *See—*
Taber, George J., 3,975,839.
Trattner, Hermann; and Raab, Hans, to Siemens Aktiengesellschaft. Non-fusible electrode, in particular for tungsten inert gas welding and a process for the production thereof. 3,976,853, Cl. 219-145.000.
Traylor, Frank T.: *See—*
Altschuler, Samuel; Traylor, Frank T.; Ziemer, Richard W.; and Knight, Charles A., 3,976,008.
Tred-X Corporation: *See—*
Barefoot, Carlton K., 3,976,532.
Trichard, Georges Edmond: *See—*
Jorigny, Gerard Andre; Royer, Jacques; and Trichard, Georges Edmond, 3,976,180.
Triet, Le Minh. Process for making shrimp chips and resultant product. 3,976,792, Cl. 426-52.000.
Trimarc Corporation: *See—*
McKeown, James Edward, 3,975,855.
Trout, Horace Q.: *See—*
Wilkalis, John E.; Barbaz, Charles G.; and Trout, Horace Q., 3,976,757.
Trovinger, Harry R. Power juicer. 3,976,001, Cl. 99-513.000.
Trunov, Gennady Vasilievich: *See—*
Dudko, Daniil Andreevich; Samsonov, Grigory Valentinovich; Maximovich, Boleslav Ivanovich; Zelenin, Vitaly Ivanovich; Klimanov, Alexandr Sergeevich; Potseluiko, Vladimir Nikolaevich; Trunov, Gennady Vasilievich; and Sleptsov, Vasily Mikhailovich, 3,976,481.
Tsai, Keh Chi; and Littauer, Ernest L., to Lockheed Missiles & Space Company, Inc. Electrolyte compositions. 3,976,509, Cl. 136-154.000.
Tseng, Ching Y.: *See—*
Hall, John B.; Tseng, Ching Y.; Vock, Manfred Hugo; Vinals, Joaquin; and Shuster, Edward J., 3,976,801.
Tsirlin, Beniamin Lvovich: *See—*
Kalnin, Igor Martynovich; Tsirlin, Beniamin Lvovich; Bukhter, Elena Zalmanovna; Terenina, Alexandra Dmitrievna; Eremkina, Galina Ivanovna; Poteiko, Andrei Ivanovich; and Breslov, Khanon Yakovlevich, 3,976,395.
Tsuboi, Masayoshi: *See—*
Mukaida, Yoshito; and Tsuboi, Masayoshi, 3,976,817.
Tsuchihashi, Kiyoshi: *See—*
Takaishi, Naotake; Inamoto, Yoshiaki; and Tsuchihashi, Kiyoshi, 3,976,706.
Takaishi, Naotake; Inamoto, Yoshiaki; and Tsuchihashi, Kiyoshi, 3,976,707.
Takaishi, Naotake; Inamoto, Yoshiaki; and Tsuchihashi, Kiyoshi, 3,976,708.
Takaishi, Naotake; Inamoto, Yoshiaki; and Tsuchihashi, Kiyoshi, 3,976,709.
Takaishi, Naotake; Inamoto, Yoshiaki; and Tsuchihashi, Kiyoshi, 3,976,710.
Takaishi, Naotake; Inamoto, Yoshiaki; and Tsuchihashi, Kiyoshi, 3,976,711.
Takaishi, Naotake; Inamoto, Yoshiaki; and Tsuchihashi, Kiyoshi, 3,976,712.
Tsuji, Kozo: *See—*
Matsunaga, Hiroomi; Tsuji, Kozo; and Saito, Teruo, 3,976,605.
Mori, Atsuo; Tsuji, Kozo; and Kitamura, Shuji, 3,976,819.
Tsuji, Nobuo: *See—*
Honjo, Satoru; Tamai, Yasuo; and Tsuji, Nobuo, 3,976,808.
Tsukahara, Masaharu: *See—*
Kubo, Takao; Ohtani, Tadao; Kojima, Shigeru; Kato, Nobuyuki; Kojima, Kiyoshi; Sakamoto, Yoichi; Konno, Isago; and Tsukahara, Masaharu, 3,976,519.
Tucker, Harold: *See—*
Morris, Roger E.; and Tucker, Harold, 3,976,610.
Tuetey, Paul Albert, to Les Fabriques d'Assortiments Reunies. Click work for a watch movement. 3,975,962, Cl. 74-1.500.
Tuffet, Pierre Edmond; Cuq, Bernard Paul; and Margot, Jean. Process and device for analizing and validating signals usable in warning systems for road-signs. 3,976,970, Cl. 340-32.000.
Tufts, Robert J.; and Christopher, Albert S. Implosion engine. 3,975,914, Cl. 60-673.000.
Tuleja, Anthony Z. Reflecting triangular warning devices. 3,975,849, Cl. 40-125.00N.
Turck, Ulrich, to Chemische Werke Huls Aktiengesellschaft. Production of binders for coating compositions. 3,976,626, Cl. 526-78.000.
Turcotte, Ronald E., to Schlumberger Technology Corporation. Well logging method and apparatus using a continuous energy spectrum photon source. 3,976,879, Cl. 250-266.000.
Turkowski, Jan: *See—*
Puschel, Siegfried; and Turkowski, Jan, 3,976,927.
Tyrone Hydraulics, Inc.: *See—*
McBurnett, James R., 3,975,909.
Uchida, Keiichiro: *See—*
Motegi, Masanori; Uchida, Keiichiro; Koshino, Minoru; Muraoka, Takatoshi; and Nagasawa, Shigeru, 3,976,866.
Ueda, Yasuo: *See—*
Nihyakumen, Kouzi; Yokoyama, Taizo; Ueda, Yasuo; Kamezawa, Yasutoki; and Aizawa, Tatsuo, 3,976,488.
Ueno, Eichiro; Kawasaki, Hideo; and Shigita, Syozo, to American Cyanamid Company. Printing process for acrylic fibers. 3,976,425, Cl. 8-62.000.
Uhing, Eugene H.: *See—*
Toy, Arthur D. F.; and Uhing, Eugene H., 3,976,690.
Uhl, Wyman F.: *See—*
Kaminstein, Bernard; and Uhl, Wyman F., 3,976,580.
UMC Industries, Inc.: *See—*
Koeneker, William V., 3,976,225.
Unelec: *See—*
Redon, Georges, 3,976,851.
Union Carbide Corporation: *See—*
Bolton, Jack C.; and Alexander, Franklin L., 3,976,087.
Colpoys, Patrick Joseph, Jr.; and Neel, Eugene Allen, Jr., 3,976,138.
Kupcikevicius, Vytautas; Nausedas, Joseph A.; and Raudys, Vytas A., 3,975,795.
Lewis, Irwin Charles; McHenry, Edgar Ronald; and Singer, Leonard Sidney, 3,976,729.
Uniroyal Inc.: *See—*
Harris, Wilbur E., 3,975,974.
Mirtain, Henri J.; and Mishory, Jonathan, 3,976,115.
Rim, Yong S.; and Nudenberg, Walter, 3,976,664.
Strunk, Richard J.; and Hubbard, Winchester Loomis, 3,976,672.
Uniroyal, S.A.: *See—*
Mirtain, Henri J.; and Mishory, Jonathan, 3,976,115.
United Packages Limited: *See—*
Rothauser, Charles; and Thompson, Bruce R., 3,975,833.
United States of America
Agriculture: *See—*
Becker, Robert, 3,976,805.
Connick, William J., Jr.; and Ellzey, Samuel E., Jr., 3,976,818.
Fanta, George F.; and Burr, Robert C., 3,976,552.
Holladay, John H.; and Shackelford, Albert D., 3,976,320.
Roberts, Earl J.; and Rowland, Stanley P., 3,976,604.
Air Force: *See—*
Boyd, Durrell D.; and Childs, Lewis B., 3,976,521.
Crosby, Edward L., Jr., 3,976,268.
Dougherty, Nathan S., Jr.; and Anderson, Charles F., 3,975,955.
Seifert, Clair F., 3,975,981.
Tarter, David A.; and Readnour, Jack L., 3,976,394.
Army: *See—*
Adamson, James R., Jr., 3,976,281.
Altschuler, Samuel; Traylor, Frank T.; Ziemer, Richard W.; and Knight, Charles A., 3,976,008.
Dogliotti, Libera M.; Chalk, Ronald C.; Spano, Leo A.; and Sieling, Dale H., 3,976,466.
Dreitzler, David R.; and Thorn, Lawrence B., 3,975,942.
F'Geppert, Erwin, 3,976,172.
Hunter, Joe S.; Bailey, Escar L.; and Little, Little J., 3,975,961.
Rosner, George, 3,976,029.
Villforth, Frederick Julius, III, 3,975,904.
Commerce: *See—*
Brungraber, Robert J., 3,975,940.
Energy Research and Development Administration: *See—*
Aggus, John R.; Giordano, Salvatore T.; and Halama, Henry J., 3,976,950.
Benton, Samuel T., 3,976,735.
Lacey, James J.; Kurtzrock, Roy C.; and Bienstock, Daniel, 3,976,592.
Miller, Lowell G.; Young, Robert C.; and Brugger, Robert M., 3,976,888.
Mitchell, John W., 3,976,479.
Newson, Melvin M., 3,976,898.
Shale, Correll C.; and Cross, William G., 3,976,747.
Sheppard, John D.; and Thomas, David G., 3,976,569.
Sowa, Edmund S., 3,976,540.
Sowa, Edmund S., 3,976,543.
Tallent, Othar K., 3,976,775.
Environmental Protection Agency: *See—*
Martin, Robert M., 3,976,457.
Health, Education and Welfare: *See—*
Walker, Elijah C., 3,976,072.
Interior: *See—*

Gomes, John M.; and O'Keefe, Daniel A., 3,976,761.
National Aeronautics and Space Administration: *See*—
Hafle, Ralph S., 3,976,997.
Navy: *See*—
Bickel, John E., 3,977,004.
Bishop, Walton B., 3,977,001.
Bottka, Nicholas; Teppo, Edward A.; and Rehn, Victor L., 3,976,873.
Hammond, Peter R., 3,976,655.
Hammond, Peter R., 3,976,656.
Hawthorne, Marion F.; and Paxson, Timm E., 3,976,596.
Karanian, Arthur J.; and O'Brien, Robert L., 3,976,088.
Kershaw, Joseph E., 3,977,003.
Khosharian, Vartan N., 3,976,976.
Langguth, Arthur F., 3,976,274.
Lewis, Adolph L., 3,975,865.
McCardell, Peter D.; and Heckman, Paul J., Jr., 3,976,369.
Mesecar, Roderick S., 3,975,957.
Rothenstein, Julius, 3,976,522.
Seeley, Robert L., 3,976,962.
Slaton, Jack H.; and Wolfe, Halley, 3,976,968.
VanBuskirk, Lyman F., 3,976,882.
U.S. Philips Corporation: *See*—
Buchner, Robert Bertold; and Maat, Jan Philippus, 3,976,843.
Enzlin, Theodoor Henri; and Smulders, Walter Henricus Maria Magdala, 3,977,020.
Fanshawe, David Geoffrey James, 3,976,899.
Janssen, Peter Johannes Michiel, 3,976,828.
Jorigny, Gerard Andre; Royer, Jacques; and Trichard, Georges Edmond, 3,976,180.
Kruishoop, Johan Christiaan Willem, 3,975,947.
Lange, Gerhard; and Falk, Detlef, 3,976,874.
Lebailly, Jacques; and Diguet, Daniel, 3,977,016.
Moussie, Michel, 3,976,983.
Nordgren, John Lennart, 3,976,012.
Ong, Daniel, 3,976,069.
Schmidt, Ernst Machiel, 3,976,870.
Schroder, Eckhard, 3,976,360.
Schroder, Gert, 3,976,946.
Thillays, Jacques Claude, 3,976,877.
U.S. Plywood-Champion Papers Inc.: *See*—
Thompson, Kenneth; and Ihde, Richard C., 3,976,527.
United States Steel Corporation: *See*—
Pringle, William L., 3,975,783.
United Technologies Corporation: *See*—
Bloomfield, David P., 3,976,507.
Kuehl, Donald K., 3,976,444.
Landau, Michael B., 3,976,506.
Stearns, Charles F., 3,975,903.
University of Southern California, The: *See*—
Whelan, James M., 3,976,599.
University of Utah, The: *See*—
Jacobsen, Stephen C.; Smith, Homer R.; and Koncher, Tawny R., 3,976,576.
Uno, Shigeo: *See*—
Nakajima, Fumito; Tekeuchi, Masato; Matsuda, Shimpei; Uno, Shigeo; Mori, Toshikatsu; Watanabe, Yoshihisa; and Imanari, Makoto, 3,976,745.
Untz, Robert W.: *See*—
Grawey, Charles E.; Untz, Robert W.; Koch, Keith E.; and Gekhardt, Charles F., 3,976,116.
Upjohn Company, The: *See*—
Kelly, Robert C., 3,976,667.
Salmond, William G., 3,976,636.
Urade, Toshinori: *See*—
Hirose, Tadatsugu; Urade, Toshinori; and Yamaguchi, Hisashi, 3,976,993.
URO Denshi Kogyo Kabushiki Kaisha: *See*—
Fujimoto, Yukio, 3,976,988.
Valmet Oy: *See*—
Kirjavainen, Alvi, 3,976,539.
Van Doorne's Bedrijfswagenfabriek DAF B.V.: *See*—
Panis, Martinus Johannes Josephus Maria, 3,975,987.
VanBuskirk, Lyman F., to United States of America, Navy. Invisible radiation imaging device. 3,976,882, Cl. 250-334.000.
van der Lely, Cornelis. Prefabricated building sections or room units and methods for their use in erecting buildings. 3,975,873, Cl. 52-79.000.
Vanderlinde, William: *See*—
Morgan, Albert W.; and Vanderlinde, William, 3,976,619.
van der Molen, Theodorus J.; Meijer, Louis A.; and Joosen, Joos D., to Stamicarbon B.V. Process for preparing ethylene polymers. 3,976,631, Cl. 526-64.000.
Van Dest, Jean Claude, to Massey-Ferguson Inc. Clutch disc with coaxial brake. 3,976,174, Cl. 192-13.00R.
Vandevier, Joseph E.; and Ellis-Anwyl, David R., to Borg-Warner Corporation. Phase sequence detector for three-phase AC power system. 3,976,919, Cl. 317-47.000.
VandeWiele, John L.: *See*—
Kerber, Dathan R.; Benson, Richard E.; and VandeWiele, John L., 3,975,889.
Van Horn, Charles A., to Chemetron Corporation. Welding torch. 3,976,852, Cl. 219-75.000.
Vanjani, Chandu R., to A.O. Smith Corporation. Single phase, two pole A.C. resistance split-phase unidirectional induction motor. 3,976,924, Cl. 318-220.00R.
Varen Technology: *See*—
Vaughan, Ronald J., 3,976,704.
Varma, Ravi K.; and Cimarusti, Christopher M., to E. R. Squibb & Sons, Inc. 3,20-Diketopregnenes having an 11β-acetal group. 3,976,637, Cl. 260-239.55D.
Varma, Ravi K.; and Cimarusti, Christopher M., to E. R. Squibb & Sons, Inc. 16α-arylcarbonylpregnenes. 3,976,638, Cl. 260-239.55R.
Varta Batterie Aktiengesellschaft: *See*—
Winsel, August; and Laig-Horstebrock, Helmut, 3,976,510.
Vasta, Joseph A., to Du Pont de Nemours, E. I., and Company. Corrosion inhibiting system containing zinc and zinc phosphate. 3,976,617, Cl. 260-39.00R.
Vaughan, Ronald J., to Varen Technology. Nitration process. 3,976,704, Cl. 260-645.000.
Vaughn, Kennith E., to Caterpillar Tractor Co. Striker bar for cleaning the tracks of track-type vehicles. 3,976,337, Cl. 305-12.000.
Veatch, Franklin: *See*—
Loder, Wallace R., Jr.; Fay, Philip S.; and Veatch, Franklin, 3,976,439.
Loder, Wallace R., Jr.; Fay, Philip S.; and Veatch, Franklin, 3,976,440.
VEB Nahmaschinenwerk Wittenberge: *See*—
Aulich, Gunter; Schultz, Dieter; and Rosel, Wilhelm, 3,976,020.
Vega Precision Laboratories, Inc.: *See*—
Moore, Thomas A.; Gehman, Earl; and Huddleston, George, 3,976,999.
Velsicol Chemical Corporation: *See*—
Hokama, Takeo; and Scardiglia, Frank, 3,976,607.
Richter, Sidney B.; and Wu, Chin Ching, 3,976,471.
Venable, Phillip G.: *See*—
Ralston, Harold A.; and Venable, Phillip G., 3,976,144.
Vereinigte Deutsche Metallwerke AG: *See*—
Wunder, Wolf; Kohne, Volker; Hill, Rosolde; and Leogrande, Antonio, 3,976,474.
Vibrodyne, Inc.: *See*—
Isaacson, Max; and Smilg, Benjamin, 3,975,863.
Vicentini, Gilles P.: *See*—
Fillion, Pierre C.; and Vicentini, Gilles P., 3,976,333.
Victor Company of Japan, Limited: *See*—
Haneji, Yasuo; and Kinjo, Hisao, 3,977,024.
Villforth, Frederick Julius, III, to United States of America, Army. Controlled exhaust gas recirculation. 3,975,904, Cl. 60-278.000.
Vinals, Joaquin: *See*—
Hall, John B.; Tseng, Ching Y.; Vock, Manfred Hugo; Vinals, Joaquin; and Shuster, Edward J., 3,976,801.
Vitous, Charles J., to Cory Food Services, Inc. Coffee brewer apparatus. 3,975,996, Cl. 99-295.000.
Vock, Manfred Hugo: *See*—
Hall, John B.; Tseng, Ching Y.; Vock, Manfred Hugo; Vinals, Joaquin; and Shuster, Edward J., 3,976,801.
Vogt, Eugen: *See*—
Siepmann, Walter, 3,975,810.
Voigt, Hans; and Rupp, Gunther, to Siemens Aktiengesellschaft. Method and apparatus for the continuous, contactless testing of a long conductor which consists at least partially of superconductive material. 3,976,934, Cl. 324-34.0SC.
Voles, Roger; and Watts, Simon, to EMI Limited. Synthetic aperture radars. 3,976,998, Cl. 343-5.0CM.
Volkov, Mstislav Vasilievich; and Oganesian, Oganes Vardanovich. Apparatus for surgical treatment of bones and joints. 3,976,061, Cl. 128-84.00B.
Vollkommer, Norbert, to Dynamit Nobel Aktiengesellschaft. Copolymers of 1,2-dimethoxy-ethylene and β-lactones or cyclic six-membered ring carbonates. 3,976,623, Cl. 260-78.3UA.
Vollrath Refrigeration, Inc.: *See*—
Kaiser, Kenneth L.; and Stowik, William, 3,975,794.
Von Aschwege, Gerd: *See*—
Bernardi, Herbert; Lehle, Erhard; Geier, Joseph; Von Aschwege, Gerd; and Haberstroh, Markus, 3,976,291.
von Eckardstein, Karl-Ernest: *See*—
Coja, Joachim; von Eckardstein, Karl-Ernest; and Meinken, Bernhard, 3,976,092.
Von Hartel, Herbert, to Coulter Information Systems, Inc. Method and apparatus for supplying background gas in a sputtering chamber. 3,976,555, Cl. 204-192.000.
Vornberger, Walter, to International Shoe Machine Corporation. Roughing machine having tool position adjusting mechanism. 3,975,932, Cl. 69-6.500.
Voss, Hermann: *See*—
Reinke, Friedhelm; Voss, Hermann; and Geisel, Herbert, 3,976,520.
Voudy, Thomas A.: *See*—
Koch, Ulrich H.; and Voudy, Thomas A., 3,976,095.
W. R. Grace & Co.: *See*—
Larsen, Donald W., 3,976,553.
W. S. Shamban & Co.: *See*—
Chaffin, Frank R., 3,975,968.
Wada, Norio: *See*—
Inouye, Sakae; Kurahashi, Suminobu; Wada, Norio; Kikuchi, Motokazu; Masuda, Kinji; Akiyama, Tsuneharu; and Osaki, Toshiyuki, 3,976,624.
Wadano, Katsumi: *See*—
Kamimura, Haruo; Yamashita, Yukio; Nakai, Toshitugu; Wadano, Katsumi; Amada, Kozo; and Matsuda, Yoshitane, 3,975,937.

Wagner, Kuno; Eimer, Johannes; Zirner, Joachim; Raab, Rainer; and Liebsch, Dietrich, to Bayer Aktiengesellschaft. Process for the production of polyisocyanates with a biuret structure. 3,976,622, Cl. 260-77.5AT.

Wagner, Ronald A., to Raytheon Company. Monopulse radar receiver. 3,977,000, Cl. 343-16.00M.

Wahnemuehl, Edgar, to Clark Equipment Company. Self-locking latch for vehicle panel members. 3,976,157, Cl. 180-69.00R.

Waiwood, William P.: *See*—
Allen, John Wesley; and Waiwood, William P., 3,976,019.

Walker, Colin Alexander; and McKelvie, James. Method of deformation measurement. 3,976,381, Cl. 356-109.000.

Walker, Donald F., to Caterpillar Tractor Co. Method and apparatus for machining housings for slant axis rotary mechanisms. 3,975,866, Cl. 51-281.00R.

Walker, Elijah C., to United States of America, Health, Education and Welfare. Blink-operated extracorporeal tear duct. 3,976,072, Cl. 128-260.000.

Walker, Robert D., to High Pressure Equipment Co. Inc. High pressure valve. 3,976,279, Cl. 251-267.000.

Wall Industries, Inc.: *See*—
Hood, Henry Alexander, 3,975,980.

Wallace, Harry L., to Burroughs Corporation. Document view station. 3,976,290, Cl. 271-64.000.

Wallouch, Rudolph W., to Airco, Inc. Locking pitch for pitch reservoir nipples. 3,976,496, Cl. 106-123.0LC.

Walter, Gerhard H. W.; and Pietsch, Gunter E. W., to Howaldtswerke-Deutsche Werft Aktiengesellschaft Hamburg und Kiel. Device for use in uniting the adjacent ends of radially split sealing rings. 3,976,534, Cl. 156-507.000.

Walter, James A. Panel structure. 3,975,882, Cl. 52-571.000.

Walters, Larry A.: *See*—
Johnson, Lawrence A.; and Walters, Larry A., 3,976,794.

Walters, Russell W., to BMR Security Products Corporation. Depository. 3,976,345, Cl. 312-333.000.

Walton, Donald R. Panel joining device. 3,975,877, Cl. 52-282.000.

Walton, Richard Rhodes; and Munchbach, George Ernest. Apparatus for compressively treating flexible sheet materials. 3,975,806, Cl. 26-18.600.

Walworth, Vivian K.: *See*—
McCann, Mary Conlin; Plummer, William T.; and Walworth, Vivian K., 3,976,368.

Warburton, Dennis: *See*—
Sharp, Brian William; Warburton, Dennis; Williams, Raymond Barry; and Wooldridge, Kenneth Robert Harry, 3,976,786.

Ward, Frank K.: *See*—
Kolaian, Jack H.; Patterson, John A.; and Ward, Frank K., 3,976,682.

Ward Products Corporation: *See*—
Cejka, Joseph B., 3,977,005.

Wardlaw, William G., to Owens-Corning Fiberglas Corporation. Skimmer. 3,976,464, Cl. 65-337.000.

Warner, Paul F., to Phillips Petroleum Company. Method for reducing the sulfur content of a petroleum fraction. 3,976,551, Cl. 204-158.00R.

Washizuka, Isamu; and Nakagawa, Hirohide, to Sharp Kabushiki Kaisha. Liquid crystal display system. 3,976,994, Cl. 340-336.000.

Wasser-Sand-Forschungs-und Vertriebsgesellschaft mbH: *See*—
Strauven, Kurt, 3,976,533.

Wasserlein, Henry George, Jr.: *See*—
Fleischhacker, James Earl; Nicholas, Vincent; and Wasserlein, Henry George, Jr., 3,975,812.

Waszkiewicz, Edmund H.: *See*—
Lauffenburger, Robert F.; and Waszkiewicz, Edmund H., 3,976,313.

Watanabe, Kunio: *See*—
Matsukura, Kameo; Watanabe, Kunio; Hashimoto, Yoshio; Nakayama, Masatoki; Nakasugi, Hajime; and Takeda, Tetuo, 3,976,514.

Watanabe, Rikizo, to Hitachi Metals, Ltd. Nickel base alloy. 3,976,480, Cl. 75-171.000.

Watanabe, Sumio; Kayano, Masanori; Ishino, Yoshio; and Miyao, Kohei, to Eisai Co., Ltd. Solid therapeutic preparation remaining in stomach. 3,976,764, Cl. 424-19.000.

Watanabe, Yoshihisa: *See*—
Nakajima, Fumito; Tekeuchi, Masato; Matsuda, Shimpei; Uno, Shigeo; Mori, Toshikatsu; Watanabe, Yoshihisa; and Imanari, Makoto, 3,976,745.

Waters, Sidney Walter, to Metal Box Limited. Capping machine. 3,975,886, Cl. 53-310.000.

Watkinson, David E. Storage-stand. 3,976,163, Cl. 182-20.000.

Watson, Bert E., to Pawling Rubber Corporation. Laminated pier bumper. 3,975,916, Cl. 61-48.000.

Watson, Billy W. Apparatus for forming a concrete feed bunk. 3,976,276, Cl. 249-149.000.

Watson, David: *See*—
Bramley, Donald; Davies, Gerald Thomas; and Watson, David, 3,975,807.

Watts, Simon: *See*—
Voles, Roger; and Watts, Simon, 3,976,998.

Webasto-Werk W.Baier KG: *See*—
Schatzler, Walter, 3,976,325.

Webb, George E. Conduit deburring tool. 3,976,388, Cl. 408-211.000.

Weber, Neill: *See*—
Minck, Robert W.; Weber, Neill; and Chang, Yu-chieh, 3,976,503.

Weber, Wilbert D., to Massey-Ferguson Industries Limited. Rethresher blower for a combine. 3,976,084, Cl. 130-27.00F.

Wecker, Leon S. Electronic calendar system. 3,975,846, Cl. 40-107.000.

Wedemeyer, Horst, to Gesellschaft fur Kernforschung m.b.H. Method for producing pure monocarbides, mononitrides and carbonitrides. 3,976,749, Cl. 423-251.000.

Weetman, David G.: *See*—
Bialy, Jerzy J.; and Weetman, David G., 3,976,441.

Weichselbaum, Theodore E., to Sherwood Medical Industries Inc. Method of sealing filter in tubular fitting for medical injection equipment and the like. 3,976,529, Cl. 156-272.000.

Weigele, Reinhold: *See*—
Moser, Kurt; and Weigele, Reinhold, 3,976,371.

Weil-McLain Co., Inc.: *See*—
Woodford, John D.; and Hiller, Trueman W., 3,976,131.

Weinheimer, Alfred J.; and Spraggins, Robert L. Novel compounds from coral. 3,976,679, Cl. 260-408.00D.

Weir, Donald H.: *See*—
Witte, Donald H.; and Weir, Donald H., 3,975,874.

Weir Pumps Limited: *See*—
Randell, Forrest Thomson, 3,976,391.

Weisman, Sorrell: *See*—
Crescas, Charles; Weisman, Sorrell; and Sharf, Joseph, 3,976,011.

Wells Manufacturing Corporation: *See*—
Alexander, Carl J.; and Boudeman, Robert J., 3,976,280.

Wenger, Charles B.: *See*—
Douglas, Larry J.; and Wenger, Charles B., 3,976,582.

Wenzel, Robert H., to Textron, Inc. Tracer mechanism having servo positioning type control means associated with plural motors. 3,976,928, Cl. 318-578.000.

Westby, Ola, to A/S Kongaberg Vapenfabrik. Procedure and apparatus for determining the geometrical shape of a surface. 3,976,382, Cl. 356-120.000.

Western Electric Company, Inc.: *See*—
Besnyo, George Frank; and Small, Byron Lee, 3,975,883.
Fullton, James McFerrin, Jr., 3,976,826.

Western Gear Corporation: *See*—
Russell, Duane K., 3,976,099.

Westfalia Separator Aktiengesellschaft: *See*—
Hemfort, Heinrich, 3,976,242.

Westinghouse Air Brake Company: *See*—
Eaton, Lyle E.; and Hyler, John H., 3,975,906.

Westinghouse Electric Corporation: *See*—
Simmonds, Leonard B., 3,976,902.
Smith, Jack R.; Burrows, Leonard H.; Heiser, Richard S.; Hertz, Richard J.; Pesavento, Joseph A.; Reuther, John F.; Shields, James J.; and Yannone, Robert A., 3,975,902.

Westvaco Corporation: *See*—
Repik, Albert J.; Miller, Charles E.; and Johnson, Homer R., 3,976,597.

Weyrich, Claus, to Siemens Aktiengesellschaft. Method of producing, metal contacts with low absorption losses on gallium phosphide luminescence diodes. 3,976,813, Cl. 427-88.000.

Wheeler, Robert Charles, to GTE Sylvania Incorporated. Automatic black level setting circuit. 3,976,836, Cl. 178-7.3DC.

Whelan, James M., to University of Southern California, The. Oxidation catalyst. 3,976,599, Cl. 252-462.000.

Whitaker, Charles T., to Marine Consultants Pty., Ltd. Marine structure. 3,975,784, Cl. 9-8.00R.

White, Addison A. Instant color movie screen. 3,976,359, Cl. 350-126.000.

White, Alan Chapman, to John Wyeth & Brother Limited. Process for the preparation of 10-(halophenyl)-2,3,4,10-tetrahydropyrimido-[1,2-a]indol-10-ol. 3,976,645, Cl. 260-251.00A.

White, Kenneth R. Refrigerant charging kit. 3,976,110, Cl. 141-346.000.

White, Robert Lee, to Cobe Laboratories, Inc. Negative pressure control system. 3,976,574, Cl. 210-188.000.

Whitey Research Tool Co.: *See*—
Koch, Ulrich H.; and Voudy, Thomas A., 3,976,095.

Whittaker Corporation: *See*—
Zernow, Louis, 3,976,010.

Wiebke, Gunter; Korsten, Andreas; Benecke, Theodor; and Petersen, Fritz, to Elektroschmelzwerk Kempten GmbH. Collector apparatus for gaseous reaction products. 3,976,829, Cl. 13-23.000.

Wiechert, Rudolf: *See*—
Eder, Ulrich; Haffer, Gregor; Ruppert, Jurgen; Sauer, Gerhard; and Wiechert, Rudolf, 3,976,701.

Wienert, Lester A.: *See*—
Buckman, Stanley J.; Fenyes, Joseph G. E.; Pera, John D.; and Wienert, Lester A., 3,976,495.

Wigma Corporation: *See*—
Harrington, Charles L., 3,976,141.

Wilder, Lawrence B., to Standard Oil Company (Indiana). Anchoring for tensioning casing in thermal wells. 3,976,139, Cl. 166-285.000.

Wilhelm Haupt, Firma: *See*—
Altmann, Horst Dieter; and Haupt, Eberhard, 3,976,855.

Wilkalis, John E.; Barbaz, Charles G.; and Trout, Horace Q., to Allied Chemical Corporation. Method for increasing the productivity of chemical reactors. 3,976,757, Cl. 423-466.000.

Wilkes, John B., to Chevron Research Company. Hydroformylation using aryl sulfonate stabilizer for cobalt catalyst. 3,976,703, Cl. 260-632.0HF.

Wille, Andreas: *See*—
Meier, Hans; and Wille, Andreas, 3,976,452.

Willette, Earl G.: *See—*
Barth, Benedict G.; Willette, Earl G.; and Barosko, John M., 3,975,986.
William H. Rorer, Inc.: *See—*
Diamond, Julius; and Douglas, George H., 3,976,643.
Williams, Alan D.; Powell, John A.; Carty, Daniel T.; and Oline, James A., to Rohm and Haas Company. Preparation and use of acrylic ionomer elastomers. 3,976,723, Cl. 260-885.000.
Williams, Clayton G.: *See—*
Harned, Harold; Hilliard, William G.; and Williams, Clayton G., 3,975,860.
Williams, Philip J.: *See—*
Breckner, Gerald; Donahue, Charles R.; Hage, C. Herbert; and Williams, Philip J., 3,976,343.
Williams, Raymond Barry: *See—*
Sharp, Brian William; Warburton, Dennis; Williams, Raymond Barry; and Wooldridge, Kenneth Robert Harry, 3,976,786.
Willingshofer, Walter: *See—*
Trachte, Kurt; Willingshofer, Walter; and Kleinschmit, Einhard, 3,976,338.
Wilson, George S.; and Sniezek, Joseph T., to Ramsey Rec Ltd. Endless conveyor belt load measurement system and method of automatically calibrating same. 3,976,150, Cl. 177-16.000.
Winsel, August; and Laig-Horstebrock, Helmut, to Varta Batterie Aktiengesellschaft. Battery recombination reactor system. 3,976,510, Cl. 136-181.000.
Winter, Max; Gautschi, Fritz; Flament, Ivon; Stoll, Max; and Goldman, Irving M., to Firmenich & Cie. Flavoring agent. 3,976,802, Cl. 426-535.000.
Wirtenson, G. Richard: *See—*
Barnes, William P., Jr.; and Wirtenson, G. Richard, 3,976,890.
Wirtz, Egon; and Ligensa, Karl Heinz, to Keiper KG. Adjusting arrangement. 3,976,327, Cl. 297-366.000.
Witkowski, Joseph T.; and Robins, Roland K., to ICN Pharmaceuticals, Inc. 1,2,4-Triazol E-3-carboxamides as antiviral agents. 3,976,545, Cl. 195-28.00N.
Witt, Alfred Nikolaus: *See—*
Hildebrandt, Jurgen J.; Zahn, Paul; Witt, Alfred Nikolaus; and Jager, Michael, 3,976,060.
Witte, Donald H.; and Weir, Donald H., to Fox Pool Corporation. Swimming pool modular construction. 3,975,874, Cl. 52-169.00R.
Witte, Josef: *See—*
Schnoring, Hildegard; Pampus, Gottfried; Schon, Nikolaus; and Witte, Josef, 3,976,609.
Wizon, Irvin, to Hitco. Graphitic fibers having superior composite properties and methods of making same. 3,976,746, Cl. 423-447.800.
Wojcik, David S.: *See—*
Miavecz, Joseph L.; Spry, Donald J.; and Wojcik, David S., 3,976,912.
Wojtowicz, John A., to Olin Corporation. Preparation of hydrazine and its compounds. 3,976,756, Cl. 423-407.000.
Wolber, Claus: *See—*
Hench, Hans, Sr.; Hunke, Friedrich; and Wolber, Claus, 3,976,254.
Wolf, Erich: *See—*
Deininger, Rolf; and Wolf, Erich, 3,976,800.
Wolfe, Halley: *See—*
Slaton, Jack H.; and Wolfe, Halley, 3,976,968.
Wolfe, Ronald C.: *See—*
Paris, Wayne H.; Wolfe, Ronald C.; Fay, Terrence P.; and Lindquist, Robert D., 3,976,736.
Woltersdorf, Otto W., Jr.: *See—*
Cragoe, Edward J., Jr.; and Woltersdorf, Otto W., Jr., 3,976,681.
Cragoe, Edward J., Jr.; and Woltersdorf, Otto W., Jr., 3,976,686.
Wood, Ernest C.: *See—*
Samuels, Peter B.; and Wood, Ernest C., 3,976,079.
Wood, William W.; Greenwood, James E.; and Clements, Walter M. Intermittent mandatory assisted ventilation system for positive pressure breathing apparatus. 3,976,064, Cl. 128-145.800.
Woodall, Ernest Joseph: *See—*
Cruce, Tommy Clay; and Woodall, Ernest Joseph, 3,976,939.
Woodford, John D.; and Hiller, Trueman W., to Weil-McLain Co., Inc. Pitless adapter with pressurized seal. 3,976,131, Cl. 166-85.000.
Woodford, William H. Sheet metal pallet. 3,976,013, Cl. 108-56.300.
Wooldridge, Kenneth Robert Harry: *See—*
Sharp, Brian William; Warburton, Dennis; Williams, Raymond Barry; and Wooldridge, Kenneth Robert Harry, 3,976,786.
Worcester, Leslie E.: *See—*
Giulie, Joe D.; and Worcester, Leslie E., 3,975,975.
Wortman, Gregory G.: *See—*
Blanco, Jose A.; Wortman, Gregory G.; Babjak, Juraj; and Itzkovitch, Irwin J., 3,976,742.
Wright, Jeffery E.: *See—*
England, John W., III; and Wright, Jeffery E., 3,976,004.
Wu, Chin Ching: *See—*
Richter, Sidney B.; and Wu, Chin Ching, 3,976,471.
Wu, Chin Tao, to RCA Corporation. Conversion of FSK to NRZ coding. 3,976,996, Cl. 340-347.0DD.
Wu, Chung Pao; Douglas, Edward Curtis; and Mueller, Charles William, to RCA Corporation. Method of obtaining the distribution profile of electrically active ions implanted in a semiconductor. 3,976,377, Cl. 356-36.000.
Wu, Yao Hua; and Rayburn, James W., to Mead Johnson & Company. Tranquilizer process employing N-(heteroarcyclic)piperazinylalkylazaspiroalkanediones. 3,976,776, Cl. 424-251.000.
Wunder, Wolf; Kohne, Volker; Hill, Rosolde; and Leogrande, Antonio, to Vereinigte Deutsche Metallwerke AG. Covering layer for metallic baths. 3,976,474, Cl. 75-96.000.
Wurlitzer Company, The: *See—*
Corbett, Michael J.; and Topolski, Alvin S., 3,976,301.
Wyncott, Daniel D.: *See—*
Quick, John L.; and Wyncott, Daniel D., 3,976,073.
Wynkoop, Raymond: *See—*
Shang, Jer-Yu; Bisson, Barry A.; and Wynkoop, Raymond, 3,976,437.
Xerox Corporation: *See—*
Brunelle, Joseph A.; Maszle, George J.; and Scudder, Thomas J., 3,976,880.
Goel, Narendra S.; and Fletcher, Gerald M., 3,976,370.
Goffe, William L., 3,976,483.
Honjo, Satoru; Tamai, Yasuo; and Tsuji, Nobuo, 3,976,808.
Lavery, Lawrence P., 3,976,833.
Murphy, Richard J., 3,976,814.
Parker, Delmer G., 3,976,881.
Yamada, Tsuyoshi: *See—*
Satake, Kunio; Yamada, Tsuyoshi; Sakamoto, Kuniaki; Hayakawa, Kiyoshi; and Fukawa, Isaburo, 3,976,721.
Yamaguchi, Hisashi: *See—*
Hirose, Tadatsugu; Urade, Toshinori; and Yamaguchi, Hisashi, 3,976,993.
Yamamoto, Haruhisa: *See—*
Akiyama, Shinichi; and Yamamoto, Haruhisa, 3,976,688.
Yamamoto, Hisao: *See—*
Takahashi, Yasuro; and Yamamoto, Hisao, 3,976,420.
Yamamoto, Masachika: *See—*
Hirai, Akiyoshi; Yamamoto, Masachika; and Kimura, Ryoichi, 3,976,167.
Yamamoto, Mayjue A., to Durfee, Daniel G. Mechanical disc brake having an automatic slack adjustor. 3,976,168, Cl. 188-71.900.
Yamamoto, Mitsuyoshi: *See—*
Nara, Takashi; Takasawa, Seigo; Okuchi, Ryo; Kawamoto, Isao; Yamamoto, Mitsuyoshi; Sato, Seiji; and Sato, Tomoyasu, 3,976,768.
Yamanaka, Akira: *See—*
Yanagisawa, Yuzuru; Ohgoshi, Akio; Yamanaka, Akira; and Muramoto, Shoichi, 3,976,907.
Yamanaka, Kazuo: *See—*
Fujino, Nobukatsu; Yamanaka, Kazuo; and Harada, Takeo, 3,976,513.
Yamashita, Iwao; and Shimizu, Miyuki, to Asahi Kasei Kogyo Kabushiki Kaisha. Structure of warmer. 3,976,049, Cl. 126-263.000.
Yamashita, Nobuo, to Olympus optical Co., Ltd. Retrofocus-type ultra-wide angle photographic lens system. 3,976,366, Cl. 350-214.000.
Yamashita, Yukio: *See—*
Kamimura, Haruo; Yamashita, Yukio; Nakai, Toshitugu; Wadano, Katsumi; Amada, Kozo; and Matsuda, Yoshitane, 3,975,937.
Yanagi, Mitsuo: *See—*
Tomita, Kenichi; Yanagi, Mitsuo; and Kobayashi, Toshiaki, 3,976,789.
Yanagisawa, Yuzuru; Ohgoshi, Akio; Yamanaka, Akira; and Muramoto, Shoichi, to Sony Corporation. Gas discharge display tube with barrier means for prevention of ion scattering. 3,976,907, Cl. 313-519.000.
Yannone, Robert A.: *See—*
Smith, Jack R.; Burrows, Leonard H.; Heiser, Richard S.; Hertz, Richard J.; Pesavento, Joseph A.; Reuther, John F.; Shields, James J.; and Yannone, Robert A., 3,975,902.
Yano, Akira: *See—*
Iwakawa, Tunekiyo; and Yano, Akira, 3,976,971.
Yanson, Boris Albertovich: *See—*
Alien, Imant Karlovich; Avdeev, Ivan Ivanovich; Gelfandbein, Yakov Aronovich; Ershov, Boris Nikolaevich; Nikonenko, Anatoly Vasilievich; Popov, Jury Olegovich; Khesin, Arkady Yakovlevich; and Yanson, Boris Albertovich, 3,976,827.
Yax, Emile; and Zander, Mechthild. Mixture of homologue anhydrides of tetra-hydrophthalic anhydride and the process for obtaining same. 3,976,590, Cl. 252-182.000.
Yodis, Anthony W.; Kremers, Frank J.; and Lintern, Karol K., to Allied Chemical Corporation. Stabilization of liquid sulfur trioxide. 3,976,751, Cl. 423-271.000.
Yokomoto, Noriaki: *See—*
Hinohara, Kango; Nishikawa, Makoto; Yokomoto, Noriaki; and Matsumura, Kenichi, 3,976,974.
Yokoyama, Taizo: *See—*
Nihyakumen, Kouzi; Yokoyama, Taizo; Ueda, Yasuo; Kamezawa, Yasutoki; and Aizawa, Tatsuo, 3,976,488.
Yokoyama, Takao: *See—*
Sekido, Satoshi; Ohhira, Tsukasa; Ikeda, Yutaka; and Yokoyama, Takao, 3,976,502.
York, Ira Bill Lee: *See—*
Gapp, Roland Howard; Toosky, Rahmatollah Fakhri; and York, Ira Bill Lee, 3,975,786.
Yoshida, Minoru, to Laurel Bank Machine Co., Ltd. Suction shafts for a paper counting apparatus. 3,976,292, Cl. 271-95.000.
Yoshikawa, Kazuo: *See—*
Toyama, Seiji; and Yoshikawa, Kazuo, 3,976,363.
Yoshimi, Toshikazu: *See—*
Tamura, Masahiko; Iwama, Kiyonori; Yoshimi, Toshikazu; and Oyaba, Takashi, 3,976,897.

Young, Larry L.; Horn, Herbert; and Endres, Joseph G., to Central Soya Company, Inc. Method for producing breaded vegetable shapes. 3,976,798, Cl. 426-291.000.

Young, Robert C.: *See*—
Miller, Lowell G.; Young, Robert C.; and Brugger, Robert M., 3,976,888.

Yu-Wen Jen, Timothy: *See*—
Hoover, John R. E.; and Yu-Wen Jen, Timothy, 3,976,641.

Zabroski, Stanley E. Emergency lamp and solid state switching circuit therefor. 3,976,986, Cl. 340-253.00C.

Zahn, Paul: *See*—
Hildebrandt, Jurgen J.; Zahn, Paul; Witt, Alfred Nikolaus; and Jager, Michael, 3,976,060.

Zander, Mechthild: *See*—
Yax, Emile; and Zander, Mechthild, 3,976,590.

Zann, Annie: *See*—
Dubois, Jean Claude; Zann, Annie; and Lavenu, Jean Claude, 3,976,591.

Zarn, Inc.: *See*—
Harned, Harold; Hilliard, William G.; and Williams, Clayton G., 3,975,860.

Zavody tazkeho strojarstva, nardoni podnik: *See*—
Polacek, Bohumil, 3,975,907.

Zeeb, Helmut: *See*—
Junginger, Gerhard; and Zeeb, Helmut, 3,976,052.

Zelenin, Vitaly Ivanovich: *See*—
Dudko, Daniil Andreevich; Samsonov, Grigory Valentinovich; Maximovich, Boleslav Ivanovich; Zelenin, Vitaly Ivanovich; Klimanov, Alexandr Sergeevich; Potseluiko, Vladimir Nikolaevich; Trunov, Gennady Vasilievich; and Sleptsov, Vasily Mikhailovich, 3,976,481.

Zelinski, Robert P.: *See*—
Smith, David R.; and Zelinski, Robert P., 3,976,630.

Zernow, Louis, to Whittaker Corporation. Spin compensated liner for shaped charge ammunition and method of making same. 3,976,010, Cl. 102-56.0SC.

Ziccarelli, Salvatore F., to Beatrice Foods Co. Fast conched candy coating and method. 3,976,806, Cl. 426-613.000.

Ziemer, Richard W.: *See*—
Altschuler, Samuel; Traylor, Frank T.; Ziemer, Richard W.; and Knight, Charles A., 3,976,008.

Zirner, Joachim: *See*—
Wagner, Kuno; Eimer, Johannes; Zirner, Joachim; Raab, Rainer; and Liebsch, Dietrich, 3,976,622.

Zumbach Electronic-Automatic: *See*—
Bommer, Paul, 3,977,008.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 24TH DAY OF AUGUST, 1976

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Air Products and Chemicals, Inc.: *See*—
Jones, John Paul, Jr., Re. 28,941.

Allied Chemical Corporation: *See*—
Wagner, John Walter; and Haylock, John Christopher, Re. 28,937.

Haylock, John Christopher: *See*—
Wagner, John Walter; and Haylock, John Christopher, Re. 28,937.

Jones, John Paul, Jr., to Air Products and Chemicals, Inc. Electrolytic timer delay capsule. Re. 28,941, Cl. 317-232.000.

Koda, Yoshinobu; Sasaki, Shosaku; and Koda, Yoshiyuki, to Toray Silicone Company, Ltd. Organopolysiloxane composition having improved heat stability. Re. 28,938, Cl. 260-448.2S.

Koda, Yoshiyuki: *See*—
Koda, Yoshinobu; Sasaki, Shosaku; and Koda, Yoshiyuki, Re. 28,938.

Komline, Elizabeth M., executrix: *See*—
Komline, Thomas R., Sr., deceased; and Wills, Walter R., Re. 28,940.

Komline-Sanderson Engineering Corporation: *See*—
Komline, Thomas R., Sr., deceased; and Wills, Walter R., Re. 28,940.

Komline, Thomas R., Sr., deceased (by Komline, Elizabeth M., executrix); and Wills, Walter R., to Komline-Sanderson Engineering Corporation. Method and apparatus for agglomeration measuring and control. Re. 28,940, Cl. 235-151.310.

Lafferty, John J.; Tedeschi, David H.; and Zirkle, Charles L., to SmithKline Corporation. 3-Aminoindazole derivatives. Re. 28,939, Cl. 424-273.000.

Minolta Camera Kabushiki Kaisha: *See*—
Nanba, Yasuhiro; Sahara, Masayoshi; and Yada, Kintaro, Re. 28,942.

Nanba, Yasuhiro; Sahara, Masayoshi; and Yada, Kintaro, to Minolta Camera Kabushiki Kaisha. Exposure time control device for a through the lens type single reflex camera. Re. 28,942, Cl. 354-24.000.

Sahara, Masayoshi: *See*—
Nanba, Yasuhiro; Sahara, Masayoshi; and Yada, Kintaro, Re. 28,942.

Sasaki, Shosaku: *See*—
Koda, Yoshinobu; Sasaki, Shosaku; and Koda, Yoshiyuki, Re. 28,938.

SmithKline Corporation: *See*—
Lafferty, John J.; Tedeschi, David H.; and Zirkle, Charles L., Re. 28,939.

Talamantez, Rudolph. Cart with automatic positioning handle and independently positionable wheels. Re. 28,936, Cl. 280-5.200.

Tedeschi, David H.: *See*—
Lafferty, John J.; Tedeschi, David H.; and Zirkle, Charles L., Re. 28,939.

Toray Silicone Company, Ltd.: *See*—
Koda, Yoshinobu; Sasaki, Shosaku; and Koda, Yoshiyuki, Re. 28,938.

Wagner, John Walter; and Haylock, John Christopher, to Allied Chemical Corporation. Control of viscosity and polycaproamide degradation during vacuum polycondensation. Re. 28,937, Cl. 260-78.00L.

Wills, Walter R.: *See*—
Komline, Thomas R., Sr., deceased; and Wills, Walter R., Re. 28,940.

Yada, Kintaro: *See*—
Nanba, Yasuhiro; Sahara, Masayoshi; and Yada, Kintaro, Re. 28,942.

Zirkle, Charles L.: *See*—
Lafferty, John J.; Tedeschi, David H.; and Zirkle, Charles L., Re. 28,939.

LIST OF PLANT PATENTEES

Duffett, William E.: *See*—
Jessel, Walter H., Jr., and Duffett. 3,944.
Jessel, Walter H., Jr., and Duffett. 3,945.
Jessel, Walter H., Jr., and Duffett. 3,946.
Jessel, Walter H., Jr., and Duffett. 3,947.

Duffett, William E., and W. W. Knicely, to Yoder Brothers, Inc. Geranium plant. 3,941, 8–24–76, Cl. 68.

Duffett, William E., and W. W. Knicely, to Yoder Brothers, Inc. Geranium plant. 3,942, 8–24–76, Cl. 68.

Duffett, William E., and W. W. Knicely, to Yoder Brothers, Inc. Geranium plant. 3,943, 8–24–76, Cl. 68.

Jessel, Walter H., Jr., and W. E. Duffett, to Yoder Brothers, Inc. Chrysanthemum plant. 3,944, 8–24–76, Cl. 68.

Jessel, Walter H., Jr., and W. E. Duffett, to Yoder Brothers, Inc. Chrysanthemum plant. 3,945, 8–24–76, Cl. 74.

Jessel, Walter H., Jr., and W. E. Duffett, to Yoder Brothers, Inc. Chrysanthemum plant. 3,946, 8–24–76, Cl. 74.

Jessel, Walter H., Jr., and W. E. Duffett, to Yoder Brothers, Inc. Chrysanthemum plant. 3,947, 8–24–76, Cl. 74.

Knicely, Walter W.: *See*—
Duffett, William E., and Knicely. 3,941.
Duffett, William E., and Knicely. 3,942.
Duffett, William E., and Knicely. 3,943.

Pinkus, Ralph. Peperomia plant (pink glow). 3,948, 8–24–76, Cl. 88.

Yoder Brothers, Inc.: *See*—
Duffett, William E., and Knicely. 3,941.
Duffett, William E., and Knicely. 3,942.
Duffett, William E., and Knicely. 3,943.
Jessel, Walter H., Jr., and Duffett. 3,944.
Jessel, Walter H., Jr., and Duffett. 3,945.
Jessel, Walter H., Jr., and Duffett. 3,946.
Jessel, Walter H., Jr., and Duffett. 3,947.

LIST OF DESIGN PATENTEES

A/S W. Jordan Borste & Penselfabrik: *See*—
Ahlstrom, Tom, and Ehrich. 241,091.

Acorn Engineering Co.: *See*—
Morris, Earl L. 241,097.

Ahlstrom, Tom, and H. Ehrich, to A/S W. Jordan Borste & Penselfabrik. Dish washing brush. 241,091, 8–24–76, Cl. D4—31.

Akazawa, Toshimasa: *See*—
Ohta, Kikuo, and Akazawa. 241,164.

Alco Standard Corp.: *See*—
Schwersler, David, and Lovejoy. 241,158.

Allibert Exploitation Societe Anonyme: *See*—
Vrignaud, Guy. 241,100.

Amfac Foods, Inc.: *See*—
Sloan, Jerry L. 241,083.

Avnet, Inc.: *See*—
Lubalin, Irwin J. 241,162.

Benedek, Barry P.: *See*—
Ferrara, Daniel A., Jr., and Benedek. 241,107.

Benztsson, Sigurd W. Fastener fitting or similar article. 241,088, 8–24–76, Cl. D2—409.

Berry, Ferdinand W. Spacer for reinforced concrete. 241,116, 8–24–76, Cl. D8—228.

Bloch, Jack, to Foster Grant Co., Inc. Spectacle front. 241,134, 8–24–76, Cl. D16—78.

Bloch, Jack, to Foster Grant Co., Inc. Spectacle front. 241,135, 8–24–76, Cl. D16—78.

Block, Robert S.: *See*—
Krieger, John F., and Block. 241,106.

Boehm, Michael: *See*—
Woodring, Cooper C., Emmerling, and Boehm. 241,167.

Botelho, Russell F. Telephone. 241,145, 8–24–76, Cl. D26—14.

Breakthru Inc.: *See*—
Krieger, John F., and Block. 241,105.
Krieger, John F., and Block. 241,106.

Burlington Industries, Inc.: *See*—
Griffin, Charles E., Jr. 241,129.

Burtt, William L.: *See*—
Mincer, William J., and Burtt. 241,137.
Mincer, William J., and Burtt. 241,138.

Chapin, James R., to General Electric Co. Locomotive. 241,128, 8–24–76, Cl. D12—38.

Coca-Cola Co., The: *See*—
Davis, Charles L. 241,099.

Columbus McKinnon Corp.: *See*—
Schreyer, Kenneth D., Ubling, and Rohosy. 241,118.

Copeland, Greg. Frame molding. 241,104, 8–24–76, Cl. D25—74.

Corneille, Gilbert R., to Laboratoire Theranol. Pregnancy diagnostic apparatus. 241,173, 8–24–76, Cl. D83—1.

Corneille, Gilbert R., to Laboratoire Theranol. Pregnancy diagnostic apparatus. 241,174, 8–24–76, Cl. D83—1.
Cournoyer, Bernard T., D. M. Wright, and J. M. O'Toole, to Barry Wright Corp. Disk storage unit or similar article. 241,177, 8–24–76, Cl. D87—1.
Covino, Caesar R. Football goal post. 241,151, 8–24–76, Cl. D34—5.
Daly, John P., W. J. Donovan, and E. J. MacDonald, to Scope Inc. Battery charger. 241,147, 8–24–76, Cl. D26—15.
Davis, Charles L., to The Coca-Cola Co. Combined display unit and dolly therefor. 241,099, 8–24–76, Cl. D6—154.
Davis, William C. Telephone handset support. 241,144, 8–24–76, Cl. D26—14.
Deaver, Furnie. Belt buckle. 241,090, 8–24–76, Cl. D2—427.
Deccofelt Corp.: *See*—
Lane, William B., and Hennessy. 241,113.
Dekker, Evert J., to Indola Cosmetics B.V. Bottle or similar article. 241,120, 8–24–76, Cl. D9—155.
Di Gennaro, Richard S.: *See*—
Matousek, Stephen, Koch, and Di Gennaro. 241,140
Diggs, Richard E. Highway safety sign. 241,127, 8–24–76, Cl. D10—111.
Donovan, William J.: *See*—
Daly, John P., Donovan, and MacDonald. 241,147.
Droll Yankees, Inc.: *See*—
Miller, Isobel, and Kilham. 241,149.
Durfee, Steven, and S. K. Hanging support for flower pots. 241,098, 8–24–76, Cl. D6—113.
Durfee, Susan K., and Steven. 241,098.
E-Z Por Corp.: *See*—
Levin, Myron M. 241,109.
Ehrich, Hans: *See*—
Ahlstrom, Tom, and Ehrich. 241,091.
Ellis, Dale S., and H. R. Smith. Reminder card rack. 241,136, 8–24–76, Cl. D19—90.
Emmerling, Ronald: *See*—
Woodring, Cooper C., and Emmerling. 241,168.
Woodring, Cooper C., Emmerling, and Boehm. 241,167.
Emminger, Mary S. Ceiling hook. 241,119, 8–24–76, Cl. D8—253.
Ferrara Benedek Design, Inc.: *See*—
Ferrara, Daniel A., Jr., and Benedek. 241,107.
Foster Grant Co., Inc.: *See*—
Bloch, Jack 241,134.
Bloch, Jack. 241,135.
Friedman, Ira S., to Rowe Furniture Corp. Seat. 241,095, 8–24–76, Cl. D6—63.
Funabiki, Yashuhiko, to Matsushita Electric Industrial Co., Ltd. Four channel sound disc demodulator. 241,146, 8–24–76, Cl. D26—14.
Garnier, Gary E., to National Semiconductor Corp. Portable electronic calculator case. 241,143, 8–24–76, Cl. D26—5.
Gatley, Derrick R., to Wilkinson Sword Ltd. Container for two shaving units. 241,122, 8–24–76, Cl. D9—186.
General Electric Co.: *See*—
Chapin, James R. 241,128.
General Foods Corp.: *See*—
Pettengill, Floyd E. 241,121.
Glaberson, Martin, to Warner-Lambert Co. Razor handle. 241,179, 8–24–76, Cl. D95—3.
Gonzalez, Boris, to Societe Anonyme Automobiles Citroen. Combined automobile dash board and steering wheel. 241,133, 8–24–76, Cl. D12—192.
Griffin, Charles E., Jr., to Burlington Industries, Inc. Industrial shipping pallet. 241,129, 8–24–76, Cl. D12—53.
Gurian, Marshall I., and G. D. Rolih, to Philip A. Hunt Chemical Corp. Spray etcher for work pieces in which the work pieces first move into the direction and then leave the etcher in a reverse. 241,159, 8–24–76, Cl. D55—1.
Gurian, Marshall I., and P. F. J. Rose, to Philip A. Hunt Chemical Corp. Spray etcher for work pieces in which piece progress in a single direction from an input ent to and output edn. 241,160, 8–24–76, Cl. D55—1.
Hale, Arthur. Physical exerciser. 241,150, 8–24–76, Cl. D34—5.
Hattori, George M., to The Prior Co. Women's jean. 241,086, 8–24–76, Cl. D2—28.
Haythornthwaite, Peter F. Carbonating machine. 241,178, 8–24–76, Cl. D94—3.
Hennessy, William J.: *See*—
Lane, William B., and Hennessy. 241,113.
Hess, Albert J. Wrench for use with skateboards. 241,114, 8–24–76, Cl. D8—26.
Holtz, Leonard, to Turn-Up, Inc. Support for a hanging flower pot or the like. 241,117, 8–24–76, Cl. D8—246.
Huckenbeck, Claus O. Binocular adjustment knob. 241,166, 8–24–76, Cl. D16—59.
Indola Cosmetics B.V.: *See*—
Dekker, Evert J. 241,120.
Inverness Corp.: *See*—
Mann, Samuel. 241,175.
Jackson, Robert W., and L. W. Johnson. Sail boat hull. 241,130, 8–24–76, Cl. D12—64.
Japan Metals & Chemicals Co., Ltd.: *See*—
Tomioka, Shigenori. 241,161.
Jaynes, Mildred. Patient status indicator. 241,182, 8–24–76, Cl. D76—12.
Jenks, Frederick R. Magnetic variable format appointment board or the like. 241,181, 8–24–76, Cl. D96—12.
Johnson, Lawrence E. Aerator pump for a swimming pool. 241,172, 8–24–76, Cl. D65—1.
Johnson, Logan W.: *See*—
Jackson, Robert W., and Johnson. 241,130.
Kapnek, Bertram H. Display case. 241,101, 8–24–76, Cl. D6—168.
Kato, Katuichi: *See*—
Nakajima, Makoto, and Kato. 241,132.
Kawasaki, Jukogyo Kabushiki Kaisha: *See*—
Nakajima, Makoto, and Kato. 241,132.
Kilham, Peter: *See*—
Miller, Isobel, and Kilham. 241,149.
Kingsford, Ted L., to Plough, Inc. Combined compact and makeup mirror. 241,176, 8–24–76, Cl. D86—10.
Knapp, Richard D. Pouring attachment for a container. 241,125, 8–24–76, Cl. D9—290.
Koch, Ulrich H.: *See*—
Matousek, Stephen, Koch, and Digennaro. 241,140.
Krieger, John F., and R. S. Block, to Breakthru Inc. Food bowl. 241,105, 8–24–76, Cl. D7—1.
Krieger, John F., and R. S. Block, to Breakthru Inc. Serving tray or the like. 241,106, 8–24–76, Cl. D7—37.
Krups, Robert: *See*—
Limberg, Klaus. 241,180.
LaBarber, Joseph A. Security latch. 241,115, 8–24–76, Cl. D8—131.
LaBarber, Joseph A. Check protector. 241,169, 8–24–76, Cl. D64—10.
Laboratoire Theranol: *See*—
Corneille, Gilbert R. 241,173.
Corneille, Gilbert R. 241,174.
Lanagan, John B., and S. Tilson, to The New Folding System, Inc. Table for folding laundry or the like. 241,103, 8–24–76. Cl. D6—179.
Lane, William B., and W. J. Hennessy, to Deccofelt Corp. Rack for drying clothes and the like. 241,113, 8–24–76, Cl. D7—196.
Lawrence, William J., to Texas Instruments, Inc. Digital watch casing. 241,126, 8–24–76, Cl. D10—88.
Levin, Myron M., to E-Z Por Corp. Roasting pan. 241,109, 8–24–76, Cl. D7—85.
Lido Foundations International, Inc.: *See*—
Smith, Lee R. 241,084.
Smith, Lee R. 241,085.
Liley, Arthur. Rotary slide rule. 241,171, 8–24–76, Cl. D64—1.
Limberg, Klaus, to Robert Krups. Electric razor. 241,180, 8–24–76, Cl. D95—3.
Lovejoy, V. Paul: *See*—
Schwerzler, David, and Lovejoy. 241,158.
Lubalin, Irwin J., to Avnet, Inc. Record player. 241,162, 8–24–76, Cl. D56—4.
MacDonald, Elliot J.: *See*—
Daly, John P., Donovan, and MacDonald. 241,147.
Macha, Daniel L. Electrically heated lunch box. 241,108, 8–24–76, Cl. D7—76.
Macklem, James C., to Syndicate Glass Inc. Divider for a display container. 241,096, 8–24–76, Cl. D6—85.
Majeski, Sylvia. Toy vehicle. 241,153, 8–24–76, Cl. D34—15.
Manderfield, Ellen B., to Oneida Ltd. Spoon or similar article. 241,111, 8–24–76, Cl. D7—137.
Mann, Samuel, to Inverness Corp. Ear-piercing device. 241,175. 8–24–76. Cl. D83—12.
Matousek, Stephen, U. H. Koch, and R. S. Digennaro, to Whitey Research Tool Co. Valve safety handle. 241,140, 8–24–76, Cl. D23—30.
Matsushita Electric Industrial Co., Ltd.: *See*—
Funabiki, Yashuhiko. 241,146.
Ohta, Kikuo, and Akazawa. 241,164.
McClure, James A. Ash tray. 241,148. 8–24–76, Cl. D27—27.
Metzner, Robert S., to SCM Corp. Typewriter. 241,170, 8–24–76, Cl. D64—11.
Miller, Isobel, and P. Kilham, to Droll Yankees, Inc. Bird Feeder. 241,149, 8–24–76, Cl. D30—13.
Mincer, William J., and W. L. Burtt. Fishing lure. 241,137, 8–24–76, Cl. D22—27.
Mincer, William J., and W. L. Burtt. Fishing lure. 241,138, 8–24–76, Cl. D22—28.
Morris, Earl L., to Acorn Engineering Co. Liquid soap dispenser. 241,097, 8–24–76, Cl. D6—95.
Muckenbeck, Claus O. Binocular adjustment knob. 241,165, 8–24–76, Cl. D16—59.
Nakajima, Makoto, and K. Kato, to Kawasaki, Jukogyo Kabushiki Kaisha. Boat. 241,132. 8–24–76, Cl. D12—174.
National Semiconductor Corp.: *See*—
Garnier, Gary E. 241,143.
New Folding System, Inc., The: *See*—
Lanagan, John B., and Tilson. 241,103.
Nishiguchi, Seiichiro, to Sharp Kabushiki Kaisha. Electronic calculating machine. 241,142. 8–24–76, Cl. D25—5.
Nystrom, Bror K. G. Dust collector for paper machine. 241,156. 8–24–76, Cl. D49—11.
Oedekerk, Gary. Tool for preparing tacos or the like. 241,110. 8–24–76. Cl. D7—99.
Ohta, Kikuo, and T. Akazawa, to Matsushita Electric Industrial Co., Ltd. Combined portable radio and cassette player. 241,164. 8–24–76. Cl. D56—4.
Olinkraft, Inc.: *See*—
Poggiali, Lewis D. 241,123.
Poggiali, Lewis D. 241,124.
Olko, Henry. Arm chair. 241,092, 8–24–76, Cl. D6—51.
Olko, Henry. Arm chair. 241,093, 8–24–76, Cl. D6—57.
Olko, Henry. Day bed with canopy. 241,094, 8–24–76, Cl. D6—59.
Olko, Henry. Work table. 241,102, 8–24–76, Cl. D6—175.
Oneida Ltd.: *See*—
Manderfield, Ellen B. 241,111.
O'Toole, Jerome M.: *See*—
Cournoyer, Bernard T., Wright, and O'Toole. 241,177.
Panth, Erik O. Clearing saw harness. 241,087, 8–24–76, Cl. D2—400.
Pettengill, Floyd E., to General Foods Corp. Combined jar and closure. 241,121, 8–24–76, Cl. D9—157.
Philip A. Hunt Chemical Corp.: *See*—
Gurian, Marshall I., and Rolih. 241,159.
Gurian, Marshall I., and Rose. 241,160.

Ploough, Inc.: *See*—
Kingsford, Ted I. 241,176.
Poggiali, Lewis D., to Olinkraft, Inc. End cap blank for a shipping package. 21,123, 8–24–76, Cl. D9—245.
Poggiali, Lewis D., to Olinkraft, Inc. End cap blank for a shipping package. 241,124, 8–24–76, Cl. D9—245.
Poulin, Eugene A. Pendant. 241,157, 8–24–76, Cl. D45—17.
Prior Co., The: *See*—
Hattori, George M. 241,086.
Raftery, William B., to Rubbermaid Commercial Products, Inc. Covered waste receptacle. 241,112, 8–24–76, Cl. D7—194.
Ray, Manuel C. A portable liquid dispensing storage unit. 241,139, 8–24–76, Cl. D23—2.
Robosy, Soma M.: *See*—
Schreyer, Kenneth D., Ubling, and Robosy. 241,118.
Rolih, Gary D.: *See*—
Gurian, Marshall I., and Rolih. 241,159.
Rose, Peter F. J.: *See*—
Gurian, Marshall I., and Rose. 241,160.
Rowe Furniture Corp.: *See*—
Friedman, Ira S. 241,095.
Rubbermaid Commercial Products, Inc.: *See*—
Raftery, William B. 241,112.
SCM Corp.: *See*—
Metzner, Robert S. 241,170.
Sayers, Roland W. Sail batten. 241,131, 8–24–76, Cl. D12—155.
Schreyer, Kenneth D., O. M. Uhling, and S. M. Robosy, to Columbus McKinnon Corp. Safety hook. 241,118, 8–24–76, Cl. D8—252.
Schwerzler, David, and V. P. Lovejoy, to Alco Standard Corp. Convention steamer. 241,158, 8–24–76, Cl. D55—1.
Scope, Inc.: *See*—
Daly, John P., Donovan, and Macdonald. 241,147.
Sharp Kabushiki Kaisha: *See*—
Nishiguchi, Seiichiro. 241,142.
Sloan, Jerry L., to Amfac Foods, Inc. Extruded frozen potato products. 241,083, 8–24–76, Cl. D1—2.
Smith, Harriett R.: *See*—
Ellis, Dale S., and Smith. 241,136.
Smith, Lee R., to Lido Foundations International, Inc., Combined panty girdle and waist cincher. 241,084, 8–24–76, Cl. D2—4.
Smith, Lee R., to Lido Foundations International, Inc., Combined brassiere and midriff cincher. 241,085, 8–24–76, Cl. D2—24.
Societe Anonyme Automobile Citroen: *See*—
Gonzalez, Boris. 241,133.
Stafstrom, Gustave T., to Waterbury Buckle Co. Hook and eye fastener. 241,089, 8–24–76, Cl. D2—418.
Stangel, Le Roy J. Combined plant and candle holder. 241,154, 8–24–76, Cl. D35—3.
Steele, Rebecca D. Shower bath stall. 241,141, 8–24–76, Cl. D23—57.
Syndicate Glass Inc.: *See*—
Macklem, James C. 241,096.
Tayler, Norman L. Game board holder for playing cards. 241,152, 8–24–76, Cl. D34—13.
Texas Instruments, Inc.: *See*—
Lawrence, William J. 241,126.
Tilson, Stephen: *See*—
Lanagan, John B., and Tilson. 241,103.
Tomioka, Shigenori, to Japan Metals & Chemicals Co., Ltd. Record player. 241,161, 8–24–76, Cl. D56—4.
Turn-up, Inc.: *See*—
Holts, Leonard. 241,117.
Ubling, Otmar M.: *See*—
Schreyer, Kenneth D., Ubling, and Robosy. 241,118.
Vrignaud, Guy, to Allibert Exploitation Societe Anonyme. Wall mounted shelf with drawers. 241,100, 8–24–76, Cl. D6—159.
Walker, Derl G. Vegetable harvester. 241,155, 8–24–76, Cl. D40—1.
Warner-Lambert Co.: *See*—
Glaberson, Martin. 241,179.
Waterbury Buckle Co.: *See*—
Stafstrom, Gustave T. 241,089.
Whitey Research Tool Co.: *See*—
Matousek, Stephen, Koch, and Digennaro. 241,140.
Wilkinson Sword Ltd.: *See*—
Gatley, Derrick R. 241,122.
Woodring, Cooper C., R. Emmerling, and M. Roehm. Combined photographic camera and strobe. 241,167, 8–24–76, Cl. D16—6.
Woodring, Cooper C., and R. Emmerling. Photographic camera with provision for side mounted strobe. 241,168, 8–24–76, Cl. D16—6.
Wright, Barry, Corp.: *See*—
Cournoyer, Bernard T., Wright, and O'Toole. 241,177.
Wright, David M.: *See*—
Cournoyer, Bernard T., Wright, and O'Toole. 241,177.
Zivica, Robert F. Radio cabinet. 241,163, 8–24–76, Cl. D56—4.

CLASSIFICATION OF PATENTS

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NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2

163 3,975,775
168 3,975,776
211 3,975,777

CLASS 3

1.91 3,975,778
13 3,975,779

CLASS 4

146 3,975,780
170 3,975,781
172 3,975,782

CLASS 5

18R 3,975,783

CLASS 8

62 3,976,425
149 3,976,426
173 3,976,427

CLASS 9

8R 3,975,784
319 3,975,785

CLASS 10

27E 3,975,786
86A 3,975,787
3,975,788

CLASS 13

23 3,976,829

CLASS 15

306A 3,975,789
339 3,975,790

CLASS 16

72 3,975,791
84.4R 3,975,792
171 3,975,793
189 3,975,794

CLASS 17

41 3,975,795
45 3,975,796
73 3,975,797

CLASS 19

98 3,975,798

CLASS 23

230R 3,976,428
259 3,976,429
273R 3,976,430
285 3,976,431
288FC 3,976,432
288S 3,976,433

CLASS 24

122.6 3,975,799
196 3,975,800
205.1C 3,975,801
205.16C 3,975,802
217R 3,975,803
221A 3,975,804
248PC 3,975,805

CLASS 26

18.6 3,975,806

CLASS 28

1.6 3,975,807

CLASS 29

25.35 3,975,808
95R 3,975,809
157R 3,975,826
157.1R 3,975,810
191.2 3,976,434
192R 3,976,435
196.6 3,976,436
203MW 3,975,812
203B 3,975,811
270 3,975,813
401F 3,975,814
433 3,975,815
446 3,975,816
568 3,975,817
578 3,975,818
611 3,975,819

CLASS 30

47 3,975,820
124 3,975,821
294 3,975,822

CLASS 32

14A 3,975,823
3,975,824
14R 3,975,825

CLASS 33

80 3,975,827
165 3,975,828
169R 3,975,829
191 3,975,830
333 3,975,831

CLASS 34

53 3,975,832
151 3,975,833

CLASS 35

1 3,975,834
13 3,975,835
30 3,975,836
63 3,975,837

CLASS 36

86 3,975,839
117 3,975,840
121 3,975,838

CLASS 37

54 3,975,841
58 3,975,842
86 3,975,843
117.5 3,975,844

CLASS 40

11R 3,975,847
106.3 3,975,845
107 3,975,846
110 3,975,848
125H 3,975,850
125N 3,975,849

CLASS 42

1S 3,975,851
40 3,975,852

CLASS 43

4 3,975,853
6.5 3,975,854
23 3,975,855
36 3,975,856
61 3,975,857

CLASS 44

56 3,976,437
61 3,976,438
68 3,976,439
3,976,440
72 3,976,441

CLASS 46

26 3,975,858

CLASS 47

31 3,975,859
38.1 3,975,860

CLASS 48

197R 3,976,442
3,976,443

CLASS 49

28 3,975,861
409 3,975,862

CLASS 51

145.87 3,975,864
163.1 3,975,863
170T 3,975,865
229 3,975,867
281R 3,975,866
307 3,976,444
358 3,975,868

CLASS 52

9 3,975,869
20 3,975,870
36 3,975,871
71 3,975,872
79 3,975,873
169R 3,975,874
211 3,975,875
282 3,975,876
3,975,877
285 3,975,878
404 3,975,879
464 3,975,880
498 3,975,881
571 3,975,882

CLASS 53

3 3,975,883
26 3,975,884
29 3,975,885
310 3,975,886
373 3,975,887
386 3,975,888

CLASS 55

68 3,976,445
71 3,976,447
73 3,976,446
122 3,976,448
139 3,976,449
158 3,976,450
3,976,451
192 3,976,452
222 3,976,453
226 3,976,454
3,976,455
238 3,976,456
270 3,976,457

CLASS 56

2 3,975,889
208 3,975,890
295 3,975,891
365 3,975,892

CLASS 57

34R 3,975,893
58.89 3,975,894
58.95 3,975,895

CLASS 58

23R 3,975,896
3,975,897
3,975,898
88R 3,975,899

CLASS 60

39.03 3,975,900
39.14 3,975,901
39.25 3,975,902
39.27 3,975,903
278 3,975,904
290 3,975,905
347 3,975,906
386 3,975,907
405 3,975,908
421 3,975,909
487 3,975,910
602 3,975,911
641 3,975,912
645 3,975,913
673 3,975,914

CLASS 61

30 3,975,915
48 3,975,916
53 3,975,917
53.5 3,975,918
89 3,976,021
108 3,975,919

CLASS 62

175 3,976,458
262 3,975,920
266 3,976,459

CLASS 63

13 3,975,921

CLASS 64

21 3,975,922
28R 3,975,923

CLASS 65

32 3,976,460
59A 3,976,461
107 3,976,462
152 3,976,463
337 3,976,464

CLASS 66

6 3,975,924
50B 3,975,925
133 3,975,926
134 3,975,927
154A 3,975,928
172E 3,975,929

CLASS 68

17R 3,975,931
189 3,975,930

CLASS 69

6.5 3,975,932

CLASS 70

70 3,975,933
120 3,975,934
232 3,975,935

CLASS 71

13 3,976,465
25 3,976,466
28 3,976,467
91 3,976,468
100 3,976,469
3,976,470
105 3,976,471

CLASS 72

38 3,975,936
209 3,975,937
239 3,975,938

CLASS 73

1DV 3,975,939
9 3,975,940
15R 3,975,941
35 3,975,942
40 3,975,943
40.5R 3,975,944
46 3,975,945
61.1C 3,975,946
61.1R 3,975,947
67.2 3,975,948
71.5R 3,975,949
94 3,975,950
116 3,975,951
117.3 3,975,952
118 3,975,953
139 3,975,954
147 3,975,955
159 3,975,956
170A 3,975,957
290V 3,975,958
411 3,975,967
419 3,975,959
425.6 3,975,960
515 3,975,961

CLASS 74

1.5 3,975,962
17.5 3,975,963
230.17A 3,975,964
242.11R 3,975,965
329 3,975,966
441 3,975,968
465 3,975,969
473R 3,975,970
3,975,971
560 3,975,972
805 3,975,973

CLASS 75

10R 3,976,472
49 3,976,473
96 3,976,474
101BE 3,976,475
128A 3,976,476
153 3,976,477
156.5 3,976,478
162 3,976,479
171 3,976,480
3,976,481
211 3,976,482

CLASS 83

1 3,975,974
410 3,975,975
556 3,975,976
707 3,975,977
796 3,975,978

CLASS 85

8.3 3,975,979

CLASS 87

6 3,975,980

CLASS 89

1B 3,975,981
163 3,975,982

CLASS 90

11C 3,975,983
11D 3,975,984
62R 3,975,985

CLASS 91

402 3,975,986
420 3,975,987
492 3,975,988

CLASS 92

48 3,975,989
57 3,975,990
117A 3,975,991
129 3,975,992
3,975,993

CLASS 93

51HW 3,975,994

CLASS 96

1PS 3,976,483
1R 3,976,484
1.2 3,976,485
3 3,976,486
33 3,976,487
49 3,976,488
76R 3,976,489
84R 3,976,490
91R 3,976,491
100 3,976,492
128 3,976,493

CLASS 98

40D 3,975,995

CLASS 99

295 3,975,996
407 3,975,997
423 3,975,998
446 3,976,000
449 3,975,999
513 3,976,001

CLASS 100

215 3,976,002
295 3,976,003

CLASS 101

26 3,976,004
395 3,976,005
414 3,976,006
425 3,976,007

CLASS 102

7.6 3,976,009
31 3,976,008
568C 3,976,010
70.2R 3,976,011
3,976,012

CLASS 106

14 3,976,494
15R 3,976,495
123LC 3,976,496
287SE 3,976,497

CLASS 108

56.3 3,976,013
64 3,976,014
92 3,976,015
144 3,976,016

CLASS 110

10 3,976,018

CLASS 111

1 3,976,017

CLASS 112

158E 3,976,019
217 3,976,020

CLASS 114

45 3,976,022
144E 3,976,023
203 3,976,024

CLASS 115

1R 3,976,025
12R 3,976,026
35 3,976,027

CLASS 118

6 3,976,028
215 3,976,029
303 3,976,030
629 3,976,031

CLASS 119

18 3,976,032

CLASS 122

7R 3,976,033

CLASS 123

1A 3,976,034
8.09 3,976,035
3,976,036
8.25 3,976,037
32SP 3,976,038
32ST 3,976,039
73AD 3,976,040
119CD 3,976,041
139AR 3,976,042
148E 3,976,043
148F 3,976,044

CLASS 125

12 3,976,045

CLASS 126

9R 3,976,046
121 3,976,047
143 3,976,048
263 3,976,049

CLASS 127

2 3,976,498
42 3,976,499

CLASS 128

2A 3,976,050
3,976,051
2.06E 3,976,055
2.08 3,976,053
2.1Z 3,976,052
4 3,976,054
24R 3,976,056
25R 3,976,057
3,976,058
80E 3,976,059
84B 3,976,061
84R 3,976,060
87R 3,976,062
142.7 3,976,063
145.8 3,976,064
3,976,065
153 3,976,066
203 3,976,067
214R 3,976,068
218D 3,976,069
221 3,976,070
260 3,976,071
3,976,072
272 3,976,073
284 3,976,074
285 3,976,075
295 3,976,076
305 3,976,077
329A 3,976,078
335 3,976,079
348 3,976,080
350R 3,976,081
418 3,976,082
425 3,976,083

CLASS 130

27F 3,976,084

CLASS 131

25 3,976,085

CLASS 134

2 3,976,500
6 3,976,086
10 3,976,501

CLASS 136

6FS 3,976,503
6GC 3,976,502
83R 3,976,504
3,976,505
86R 3,976,506
3,976,507
89 3,976,508
154 3,976,509
181 3,976,510

CLASS 137

15 3,976,087
15.1 3,976,088
83 3,976,089
117 3,976,090
318 3,976,091
343 3,976,092
344 3,976,093
375 3,976,094
385 3,976,095
493.2 3,976,096
596.13 3,976,097
608 3,976,098
614.01 3,976,099
614.03 3,976,100
624.2 3,976,101
625.47 3,976,102
625.69 3,976,103
806 3,976,104

CLASS 139

384B 3,976,106
435 3,976,107
436 3,976,105

CLASS 140
93A 3,976,108
CLASS 141
9 3,976,109
346 3,976,110
CLASS 144
34R 3,976,111
223 3,976,112
241 3,976,271
CLASS 148
1.5 3,976,511
3,976,512
2 3,976,513
12F 3,976,514
26 3,976,515
32 3,976,516
111 3,976,517
113 3,976,518
120 3,976,519
127 3,976,520
CLASS 149
5 3,976,521
19.4 3,976,522
CLASS 150
12 3,976,113
CLASS 152
158 3,976,114
361R 3,976,115
405 3,976,116
CLASS 156
6 3,976,523
8 3,976,524
72 3,976,525
212 3,976,526
244 3,976,527
3,976,528
272 3,976,529
306 3,976,530
361 3,976,531
405 3,976,532
497 3,976,533
507 3,976,534
601 3,976,535
620 3,976,536
CLASS 159
23 3,976,537
CLASS 162
17 3,976,538
344 3,976,539
CLASS 164
48 3,976,117
119 3,976,118
268 3,976,119
330 3,976,120
CLASS 165
11 3,976,121
27 3,976,122
29 3,976,123
35 3,976,124
45 3,976,125
110 3,976,126
125 3,976,127
153 3,976,128
154 3,976,129
CLASS 166
84 3,976,130
85 3,976,131
3,976,132
120 3,976,133
3,976,134
264 3,976,136
272 3,976,137
276 3,976,135
280 3,976,138
285 3,976,139
295 3,976,140
CLASS 169
90 3,976,141
CLASS 171
16 3,976,142
101 3,976,143
CLASS 172
267 3,976,144
615 3,976,145
788 3,976,146
CLASS 173
22 3,976,147
CLASS 174
151 3,976,825
CLASS 175
7 3,976,148
52 3,976,149
CLASS 176
36R 3,976,540
37 3,976,541
38 3,976,834
43 3,976,542
86R 3,976,543
CLASS 177
16 3,976,150
CLASS 178
6 3,976,826
3,976,827
6.6B 3,976,830
6.6R 3,976,828
6.8 3,976,831
3,976,832
7.3DC 3,976,836
7.6 3,976,833
70R 3,976,835
791 3,976,837
CLASS 179
1E 3,976,838
1.5M 3,976,839
2DP 3,976,840
15AT 3,976,841
15BY 3,976,843
15.55R 3,976,844
15.55T 3,976,842
18DA 3,976,846
18GF 3,976,845
99 3,976,847
107R 3,976,848
175.25 3,976,849
CLASS 180
6.5 3,976,151
9 3,976,152
9.2C 3,976,153
24.05 3,976,154
41 3,976,156
69R 3,976,157
105R 3,976,159
132 3,976,158
CLASS 181
33HD 3,976,160
116 3,976,161
141 3,976,162
CLASS 182
20 3,976,163
89 3,976,164
CLASS 184
6.16 3,976,165
CLASS 187
19 3,976,166
CLASS 188
1A 3,976,167
71.9 3,976,168
73.3 3,976,169
236 3,976,170
345 3,976,171
CLASS 192
8R 3,976,172
3,976,173
13R 3,976,174
44 3,976,175
CLASS 193
12 3,976,176
37 3,976,177
CLASS 194
67 3,976,178
CLASS 195
2 3,976,544
28N 3,976,545
29 3,976,546
127 3,976,547
CLASS 196
132 3,976,179
CLASS 197
1R 3,976,180
17 3,976,181
91 3,976,182
151 3,976,183
3,976,184
162 3,976,185
CLASS 198
8 3,976,186
24 3,976,187
31AA 3,976,188
36 3,976,189
37 3,976,190
154 3,976,191
195 3,976,192
CLASS 200
51.1 3,976,850
85R 3,976,851
CLASS 202
118 3,976,548
CLASS 204
1R 3,976,549
98 3,976,550
158R 3,976,551
159.12 3,976,552
159.22 3,976,553
181 3,976,554
192 3,976,555
262 3,976,556
CLASS 206
72 3,976,193
87 3,976,194
362 3,976,195
526 3,976,196
CLASS 208
10 3,976,557
11R 3,976,558
89 3,976,559
138 3,976,560
216 3,976,561
3,976,562
CLASS 209
3 3,976,563
11 3,976,197
38 3,976,564
111.7T 3,976,198
111.8 3,976,199
166 3,976,565
3,976,566
430 3,976,567
CLASS 210
16 3,976,568
23F 3,976,569
30A 3,976,570
38B 3,976,571
94 3,976,572
158 3,976,573
188 3,976,574
220 3,976,575
321B 3,976,576
333R 3,976,577
484 3,976,578
516 3,976,579
CLASS 211
18 3,976,200
59 3,976,201
CLASS 212
27 3,976,202
CLASS 214
1BB 3,976,204
1BC 3,976,203
1CM 3,976,206
1QD 3,976,205
2.5 3,976,207
6H 3,976,208
85 3,976,209
85.5 3,976,210
138R 3,976,211
332 3,976,212
450 3,976,213
519 3,976,214
CLASS 215
253 3,976,215
307 3,976,216
329 3,976,217
CLASS 219
75 3,976,852
145 3,976,853
505 3,976,854
532 3,976,855
CLASS 220
316 3,976,218
CLASS 221
310 3,976,219
CLASS 222
57 3,976,220
61 3,976,221
70 3,976,222
94 3,976,223
107 3,976,224
108 3,976,225
135 3,976,226
136 3,976,227
143 3,976,228
146HE 3,976,229
3,976,230
177 3,976,231
193 3,976,232
CLASS 224
4E 3,976,233
45S 3,976,234
CLASS 226
11 3,976,235
50 3,976,236
97 3,976,237
CLASS 228
5.1 3,976,240
119 3,976,239
CLASS 229
51TS 3,976,241
CLASS 233
20R 3,976,242
CLASS 235
61.11D 3,976,858
61.11E 3,976,857
61.11R 3,976,856
92PE 3,976,859
151.11 3,976,861
151.3 3,976,860
151.31 Re.28,940
151.34 3,976,862
152 3,976,863
153AC 3,976,864
153AK 3,976,865
168 3,976,866
169 3,976,867
184 3,976,868
189 3,976,869
CLASS 236
6 3,976,243
49 3,976,244
93A 3,976,245
CLASS 239
57 3,976,246
135 3,976,247
416.1 3,976,248
533 3,976,249
3,976,250
CLASS 240
1.3 3,976,870
6.45P 3,976,871
CLASS 241
20 3,976,251
46.02 3,976,252
167 3,976,253
222 3,976,254
264 3,976,255
CLASS 242
4B 3,976,256
55 3,976,257
75.51 3,976,258
78 3,976,259
86.5R 3,976,260
128 3,976,261
192 3,976,262
201 3,976,263
CLASS 243
19 3,976,264
CLASS 244
2 3,976,265
3.21 3,976,266
115 3,976,268
119 3,976,269
134F 3,976,270
186 3,976,267
CLASS 246
5 3,976,272
CLASS 248
221R 3,976,273
363 3,976,274
487 3,976,275
CLASS 249
149 3,976,276
CLASS 250
211J 3,976,873
211R 3,976,872
213VT 3,976,874
226 3,976,875
227 3,976,876
3,976,877
253 3,976,878
266 3,976,879
324 3,976,880
3,976,881
334 3,976,882
343 3,976,883
3,976,884
445T 3,976,885
3,976,886
468 3,976,887
500 3,976,888
510 3,976,889
3,976,890
575 3,976,891
CLASS 251
7 3,976,277
149.6 3,976,278
267 3,976,279
339 3,976,280
CLASS 252.
2 3,976,580
8.55D 3,976,582
8.8 3,976,581
62.1L 3,976,583
77 3,976,584
78.5 3,976,585
89 3,976,586
106 3,976,587
117 3,976,588
180 3,976,589
182 3,976,590
299 3,976,591
372 3,976,592
391 3,976,593
400A 3,976,594
428 3,976,595
431P 3,976,596
445 3,976,597
455Z 3,976,598
462 3,976,599
511 3,976,600
550 3,976,601
CLASS 254
126 3,976,281
132 3,976,282
146 3,976,283
CLASS 259
168 3,976,284
191 3,976,285
CLASS 260
2EN 3,976,604
2EP 3,976,602
2R 3,976,603
2.5HA 3,976,605
4AR 3,976,606
3,976,607
3,976,608
17R 3,976,609
23AR 3,976,611
23TN 3,976,610
23R 3,976,612
29.1SB 3,976,613
29.4UA 3,976,614
29.6HN 3,976,615
30.6R 3,976,616
39R 3,976,617
40R 3,976,618
45.7P 3,976,619
45.9NC 3,976,620
66 3,976,621
77.5AT 3,976,622
78A Re.28,937
78.3UA 3,976,623
79.5B 3,976,624
79.5P 3,976,625
140R 3,976,633
239BB 3,976,634
239.1 3,976,635
239.55D 3,976,637
239.55R 3,976,636
3,976,638
240D 3,976,639
240.1 3,976,640
243R 3,976,641
247.1E 3,976,642
247.5R 3,976,643
250B 3,976,644
251A 3,976,645
268H 3,976,646
268S 3,976,647
270PY 3,976,648
281P 3,976,649
287K 3,976,650
287P 3,976,651
289D 3,976,652
293.83 3,976,653
294.8B 3,976,654
296R 3,976,655
307G 3,976,657
307R 3,976,656
310R 3,976,658
326.15 3,976,659
326.43 3,976,660
326.5SF 3,976,661
343.2R 3,976,662
346.2M 3,976,664
346.2R 3,976,663
346.3 3,976,665
346.4 3,976,666
365 3,976,667
397.6 3,976,668
404.5 3,976,669
408D 3,976,679
410.9R 3,976,670
428 3,976,671
429.7 3,976,672
438.1 3,976,673
448R 3,976,674
448.2S Re.28,938
448.8R 3,976,675
3,976,676
465D 3,976,677
465.6 3,976,678
471A 3,976,680
473F 3,976,681
501.11 3,976,682
501.19 3,976,683
514.5 3,976,684
515M 3,976,685
520C 3,976,686
3,976,687
530N 3,976,688
534C 3,976,689
543P 3,976,690
544F 3,976,691
557R 3,976,692
566A 3,976,693
570.5C 3,976,694
570.6 3,976,695
571 3,976,696
583R 3,976,697
584R 3,976,698
586R 3,976,699
593R 3,976,700
611A 3,976,701
621R 3,976,702
632HF 3,976,703
645 3,976,704
654H 3,976,705
666PY 3,976,706
3,976,707
3,976,708
3,976,709
3,976,710
3,976,711
3,976,712
683.45 3,976,713
683.47 3,976,714
836 3,976,715
3,976,716
3,976,717
3,976,718
3,976,719
857G 3,976,720
880R 3,976,721
3,976,722
885 3,976,723
889 3,976,724
892 3,976,725
CLASS 261
1 3,976,726
116 3,976,727
CLASS 264
26 3,976,728
29.7 3,976,729
37 3,976,730
46.4 3,976,731
89 3,976,732
3,976,733
3,976,734
125 3,976,735
148 3,976,736
182 3,976,737
3,976,738
219 3,976,739
229 3,976,740
256 3,976,741
CLASS 266
99 3,976,238
225 3,976,286
CLASS 267
139 3,976,287
CLASS 269
21 3,976,288
56 3,976,289
CLASS 271
64 3,976,290
94 3,976,291
95 3,976,292
CLASS 273
2 3,976,293
3A 3,976,294
60R 3,976,295
85A 3,976,296
95A 3,976,297
106.5R 3,976,298
171 3,976,299
CLASS 274
1R 3,976,300
10D 3,976,301
CLASS 280
5.2 Re.28,936
6H 3,976,302
11.37E 3,976,303
3,976,304
32.5 3,976,155
279 3,976,307
626 3,976,308
644 3,976,309
744 3,976,305
763 3,976,306
766 3,976,310
CLASS 285
12 3,976,311
45 3,976,312
84 3,976,313
238 3,976,314
CLASS 292
104 3,976,315
251.5 3,976,316
340 3,976,317
346 3,976,318
CLASS 294
5.5 3,976,319
67R 3,976,320
81R 3,976,321
111 3,976,322
CLASS 296
102 3,976,323
107 3,976,324
137 3,976,325
CLASS 297
333 3,976,326
366 3,976,327
377 3,976,328
CLASS 302
2R 3,976,329
3,976,330
53 3,976,331
57 3,976,332
CLASS 303
2 3,976,333
6C 3,976,334

21F 3,976,335
3,976,336

CLASS 305

12 3,976,337

CLASS 307

205 3,976,892
208 3,976,893
229 3,976,894
235F 3,976,895
297 3,976,896

CLASS 308

10 3,976,339
26 3,976,338
184R 3,976,340
187.1 3,976,341
237R 3,976,342

CLASS 310

8.2 3,976,897
8.3 3,976,898
3,976,899
8.7 3,976,900
213 3,976,904
214 3,976,901
3,976,902
232 3,976,903

CLASS 312

219 3,976,343
263 3,976,344
333 3,976,345
350 3,976,346

CLASS 313

103 3,976,905
146 3,976,908
341 3,976,909
500 3,976,906
519 3,976,907

CLASS 315

92 3,976,910
101 3,976,911
169TV 3,976,912
241P 3,976,913
3,976,914
3,976,915

CLASS 317

4 3,976,916
13R 3,976,917
18D 3,976,918
47 3,976,919
49 3,976,920
135R 3,976,921
231 3,976,922
232 Re.28,941

CLASS 318

128 3,976,923
220R 3,976,924
257 3,976,925
331 3,976,926
421 3,976,927
578 3,976,928
594 3,976,929

CLASS 321

5 3,976,930
18 3,976,931
45R 3,976,932

CLASS 324

4 3,976,937
28R 3,976,933
34SC 3,976,934
34R 3,976,935
37 3,976,936
43R 3,976,938
66 3,976,939
73R 3,976,940
142 3,976,941
3,976,942

CLASS 325

317 3,976,943
451 3,976,944

CLASS 328

14 3,976,945
39 3,976,946
108 3,976,947
138 3,976,948
206 3,976,949
229 3,976,950

CLASS 330

29 3,976,951
30D 3,976,952
43 3,976,953
69 3,976,954
207P 3,976,955

CLASS 331

94.5D 3,976,956
94.5S 3,976,957

CLASS 333

6 3,976,958
26 3,976,959

CLASS 335

58 3,976,960
146 3,976,961
153 3,976,962
206 3,976,963
245 3,976,964

CLASS 336

120 3,976,965

CLASS 337

104 3,976,966
211 3,976,967

CLASS 339

35 3,976,347
74R 3,976,348
95R 3,976,349
97P 3,976,350
99R 3,976,351
177R 3,976,352
274 3,976,353

CLASS 340

3D 3,976,968
6R 3,976,969

32 3,976,970
146.1AB 3,976,972
146.3F 3,976,973
149A 3,976,974
172.5 3,976,975
3,976,976
3,976,977
3,976,978
3,976,979
3,976,980
3,976,981
3,976,982
173SP 3,976,983
173R 3,976,984
228R 3,976,985
253C 3,976,986
255 3,976,987
258A 3,976,988
270 3,976,989
324AD 3,976,990
324A 3,976,991
324M 3,976,971
3,976,992
3,976,993
336 3,976,994
337 3,976,995
347DD 3,976,996
347SY 3,976,997

CLASS 343

5CM 3,976,998
7.3 3,976,999
16M 3,977,000
17.7 3,977,001
106D 3,977,002
702 3,977,003
705 3,977,004
715 3,977,005
778 3,977,006

CLASS 346

1 3,977,007
3,977,008
74R 3,977,009
75 3,977,010

CLASS 350

3.5 3,976,354
96WG 3,976,356
96C 3,976,355
3,976,358
96R 3,976,357
126 3,976,359
150 3,976,360
160LC 3,976,361
3,976,362
173 3,976,363
179 3,976,364
214 3,976,365
3,976,366
3,976,367
286 3,976,368
319 3,976,369

CLASS 354

24 Re.28,942
3,977,011
29 3,977,012
75 3,977,013
196 3,977,014

CLASS 355

3DD 3,976,371
3R 3,976,370
4 3,976,372
10 3,976,373
14 3,976,374
3,976,375
133 3,976,376

CLASS 356

36 3,976,377
96 3,976,378
106R 3,976,379
109 3,976,380
3,976,381
120 3,976,382
166 3,976,383
200 3,976,384

CLASS 357

3 3,977,015
17 3,977,016
22 3,977,017
30 3,977,018
48 3,977,019
51 3,977,020

CLASS 358

4 3,977,021
67 3,977,022

CLASS 360

3,977,023
78 3,977,024

CLASS 403

284 3,976,385

CLASS 408

43 3,976,386
204 3,976,387
211 3,976,388

CLASS 415

25 3,976,389
53R 3,976,390
3,976,391
110 3,976,392
119 3,976,393
144 3,976,394
199A 3,976,395

CLASS 416

119 3,976,396
154 3,976,397
180 3,976,398
201R 3,976,399

CLASS 417

248 3,976,400
393 3,976,401
566 3,976,402

CLASS 418

32 3,976,403
88 3,976,404
102 3,976,405
142 3,976,406
3,976,407
153 3,976,408

CLASS 423

24 3,976,742
101 3,976,743
118 3,976,744
239 3,976,745
244 3,976,747
251 3,976,748
3,976,749
3,976,775
258 3,976,750
271 3,976,751
305 3,976,752
351 3,976,753
383 3,976,754
387 3,976,755
407 3,976,756
447.8 3,976,746
466 3,976,757
478 3,976,758
484 3,976,759
493 3,976,760
610 3,976,761

CLASS 424

1 3,976,762
1.5 3,976,763
19 3,976,764
54 3,976,765
83 3,976,766
89 3,976,767
118 3,976,768
175 3,976,769
177 3,976,770
3,976,771
248 3,976,772
250 3,976,773
3,976,774
251 3,976,776
263 3,976,777
273 Re.28,939
3,976,778
274 3,976,779
275 3,976,780
309 3,976,781
319 3,976,782
322 3,976,783
324 3,976,784
3,976,785
3,976,786
326 3,976,787
342 3,976,788
365 3,976,789

CLASS 425

48 3,976,409
71 3,976,410
72R 3,976,411

81 3,976,412
117 3,976,413
131.1 3,976,414
145 3,976,415
242R 3,976,416
307 3,976,417
388 3,976,418
467 3,976,419

CLASS 426

3 3,976,790
19 3,976,791
52 3,976,792
96 3,976,793
103 3,976,794
115 3,976,795
3,976,796
131 3,976,797
291 3,976,798
311 3,976,799
3,976,800
534 3,976,801
535 3,976,802
572 3,976,803
597 3,976,804
599 3,976,805
613 3,976,806

CLASS 427

17 3,976,808
34 3,976,809
40 3,976,810
58 3,976,811
74 3,976,812
88 3,976,813
126 3,976,814
192 3,976,815
304 3,976,816
308 3,976,817
381 3,976,818

CLASS 428

16 3,976,807
35 3,976,819
85 3,976,820
474 3,976,821
500 3,976,822
539 3,976,823

CLASS 431

10 3,976,420
29 3,976,421

CLASS 432

58 3,976,422
236 3,976,423
247 3,976,424

CLASS 526

14 3,976,627
22 3,976,628
23 3,976,824
64 3,976,631
78 3,976,626
113 3,976,632
227 3,976,629
335 3,976,630

CLASSIFICATION OF DESIGNS

D1— 2 241,083
D2— 4 241,084
24 241,085
28 241,086
400 241,087
409 241,088
418 241,089
427 241,090
D4— 31 241,091
D6— 51 241,092
57 241,093
59 241,094
63 241,095
85 241,096
95 241,097
113 241,098
154 241,099
159 241,100
168 241,101
175 241,102
179 241,103
D7— 1 241,105
37 241,106
52 241,107
76 241,108
85 241,109
99 241,110
137 241,111
194 241,112
196 241,113
D8— 26 241,114
131 241,115
228 241,116
246 241,117
252 241,118
253 241,119
D9— 155 241,120
157 241,121
186 241,122
245 241,123
290 241,125
D10— 38 241,126
111 241,127
D12— 38 241,128
53 241,129
64 241,130
155 241,131
174 241,132
192 241,133
D16— 6 241,167
241,168
59 241,165
241,166
78 241,134
241,135
D19— 90 241,136
D22— 27 241,137
28 241,138
D23— 2 241,139
30 241,140
57 241,141
D25— 74 241,104
D26— 5C 241,142
241,143
14A 241,144
241,145
L 241,146
15B 241,147
27 241,148
D27— 13 241,149
D30— 5K 241,150
D34— V 241,151
13A 241,152
15AJ 241,153
3B 241,154
D35— 1E 241,155
D40— 17 241,157
D45— 11 241,156
D49— 1E 241,158
D55— R 241,159
241,160
D56— 4B 241,163
241,164
R 241,161
241,162
D64— 1B 241,171
10 241,169
11A 241,170
D65— 1R 241,172
D76— 12 241,182
D83— 1U 241,173
V 241,174
12A 241,175
D86— 10N 241,176
D87— 1D 241,177
D94— 3R 241,178
D95— A 241,179
241,180
D96— 12E 241,181

CLASSIFICATION OF PLANTS

P. — 68 3,941
P. — 3,942
P. — 3,943
P. — 3,944
P. — 74 3,945
P. — 3,946
P. — 3,947
P. — 88 3,948

GEOGRAPHICAL INDEX OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

Alabama..... 1
Alaska..... 2
American Samoa..... 3
Arizona..... 4
Arkansas..... 5
California..... 6
Canal Zone..... 7
Colorado..... 8
Connecticut..... 9
Delaware..... 10
District of Columbia..... 11
Florida..... 12
Georgia..... 13
Guam..... 14
Hawaii..... 15
Idaho..... 16
Illinois..... 17
Indiana..... 18
Iowa..... 19
Kansas..... 20
Kentucky..... 21
Louisiana..... 22
Maine..... 23
Maryland..... 24
Massachusetts..... 25
Michigan..... 26
Minnesota..... 27
Mississippi..... 28
Missouri..... 29
Montana..... 30
Nebraska..... 31
Nevada..... 32
New Hampshire..... 33
New Jersey..... 34
New Mexico..... 35
New York..... 36
North Carolina..... 37
North Dakota..... 38
Ohio..... 39
Oklahoma..... 40
Oregon..... 41
Pennsylvania..... 42
Puerto Rico..... 43
Rhode Island..... 44
South Carolina..... 45
South Dakota..... 46
Tennessee..... 47
Texas..... 48
Utah..... 49
Vermont..... 50
Virginia..... 51
Virgin Islands..... 52
Washington..... 53
West Virginia..... 54
Wisconsin..... 55
Wyoming..... 56
U.S. Air Force..... 57
U.S. Army..... 58
U.S. Navy..... 59

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

PATENTS

1 : 3,975,830	3,976,054	3,976,656	3,976,582	3,976,326	3,976,413
3,975,942	3,976,068	3,976,678	3,976,726	3,976,388	3,976,471
3,975,961	3,976,079	3,976,679	3,976,914	3,976,389	3,976,525
3,975,979	3,976,087	3,976,687	3,976,915	3,976,429	3,976,540
3,976,013	3,976,091	3,976,699	3,976,945	13 : 3,975,851	3,976,543
3,976,567	3,976,095	3,976,703	9 : 3,975,852	3,975,853	3,976,552
3,976,815	3,976,104	3,976,704	3,975,864	3,975,884	3,976,560
4 : 3,976,282	3,976,113	3,976,713	3,975,967	3,975,910	3,976,565
3,976,299	3,976,153	3,976,733	3,975,983	3,975,946	3,976,566
3,976,339	3,976,168	3,976,746	3,975,985	3,976,032	3,976,607
3,976,458	3,976,188	3,976,753	3,976,037	3,976,045	3,976,615
3,976,892	3,976,201	3,976,772	3,976,044	3,976,119	3,976,619
3,976,949	3,976,209	3,976,790	3,976,088	3,976,320	3,976,665
3,976,977	3,976,220	3,976,797	3,976,198	3,976,426	3,976,671
3,976,978	3,976,222	3,976,805	3,976,230	16 : 3,975,867	3,976,740
5 : 3,975,915	3,976,227	3,976,809	3,976,303	3,976,888	3,976,787
3,976,030	3,976,241	3,976,837	3,976,304	17 : 3,975,785	3,976,788
3,976,151	3,976,248	3,976,840	3,976,306	3,975,795	3,976,791
3,976,980	3,976,260	3,976,858	3,976,442	3,975,828	3,976,798
3,976,997	3,976,262	3,976,864	3,976,443	3,975,855	3,976,806
6 : 3,975,780	3,976,274	3,976,873	3,976,444	3,975,858	3,976,871
3,975,786	3,976,287	3,976,876	3,976,477	3,975,906	3,976,961
3,975,787	3,976,294	3,976,882	3,976,500	3,975,952	3,976,990
3,975,788	3,976,298	3,976,884	3,976,506	3,975,963	3,977,007
3,975,796	3,976,314	3,976,895	3,976,507	3,975,973	18 : 3,975,887
3,975,805	3,976,316	3,976,906	3,976,541	3,975,984	3,975,974
3,975,817	3,976,317	3,976,916	3,976,650	3,975,996	3,976,083
3,975,825	3,976,361	3,976,921	3,976,664	3,976,073	3,976,110
3,975,843	3,976,369	3,976,926	3,976,672	3,976,101	3,976,128
3,975,844	3,976,378	3,976,928	3,976,675	3,976,103	3,976,156
3,975,854	3,976,385	3,976,938	3,976,690	3,976,108	3,976,176
3,975,861	3,976,386	3,976,940	3,976,756	3,976,116	3,976,231
3,975,862	3,976,390	3,976,953	3,976,804	3,976,124	3,976,256
3,975,865	3,976,400	3,976,954	3,976,816	3,976,154	3,976,501
3,975,877	3,976,402	3,976,959	3,976,830	3,976,158	3,976,532
3,975,882	3,976,446	3,976,962	3,976,834	3,976,164	3,976,674
3,975,899	3,976,450	3,976,966	3,976,879	3,976,170	3,976,776
3,975,914	3,976,467	3,976,968	10 : 3,975,878	3,976,183	3,976,925
3,975,916	3,976,470	3,976,976	3,976,265	3,976,187	3,976,932
3,975,935	3,976,509	3,976,982	3,976,669	3,976,195	3,976,985
3,975,945	3,976,512	3,976,986	3,976,720	3,976,196	19 : 3,975,889
3,975,950	3,976,515	3,977,003	12 : 3,975,812	3,976,208	3,976,063
3,975,968	3,976,522	3,977,004	3,975,845	3,976,210	3,976,078
3,975,975	3,976,542	3,977,010	3,975,846	3,976,219	3,976,131
3,975,981	3,976,545	8 : 3,975,789	3,975,849	3,976,234	3,976,144
3,975,982	3,976,558	3,976,200	3,976,017	3,976,278	20 : 3,976,145
3,976,001	3,976,596	3,976,228	3,976,067	3,976,283	3,976,186
3,976,008	3,976,599	3,976,354	3,976,163	3,976,323	3,976,284
3,976,009	3,976,602	3,976,408	3,976,268	3,976,337	21 : 3,975,813
3,976,010	3,976,654	3,976,573	3,976,297	3,976,350	3,975,920
3,976,027	3,976,655	3,976,574	3,976,318	3,976,404	3,975,995

3,976,447
3,976,455
22 : 3,976,018
3,976,022
3,976,130
3,976,132
3,976,135
3,976,559
3,976,562
3,976,604
3,976,670
3,976,818
23 : 3,976,025
3,976,076
24 : Re.28,936
3,975,834
3,975,835
3,975,883
3,975,913
3,975,939
3,975,940
3,975,999
3,976,072
3,976,123
3,976,364
3,976,433
3,976,553
3,977,001
25 : 3,975,806
3,975,903
3,975,932
3,976,048
3,976,056
3,976,071
3,976,080
3,976,216
3,976,368
3,976,435
3,976,466
3,976,486
3,976,489
3,976,490
3,976,491
3,976,493
3,976,508
3,976,555
3,976,588
3,976,600
3,976,613
3,976,640
3,976,647
3,976,659
3,976,662
3,976,668
3,976,730
3,976,814
3,976,845
3,976,862
3,976,883
3,976,890
3,976,894
3,976,918
3,976,922
3,976,979
3,976,995
3,977,000
3,977,012
3,977,013
3,977,014
3,977,022
26 : 3,975,779
3,975,782
3,975,783
3,975,790
3,975,826
3,975,847
3,975,868
3,975,881
3,975,908
3,975,944
3,975,953
3,975,954
3,975,970
3,975,972
3,975,992
3,975,997

3,976,046
3,976,064
3,976,096
3,976,125
3,976,141
3,976,172
3,976,229
3,976,235
3,976,280
3,976,290
3,976,359
3,976,418
3,976,434
3,976,476
3,976,497
3,976,503
3,976,526
3,976,528
3,976,564
3,976,577
3,976,584
3,976,614
3,976,636
3,976,644
3,976,667
3,976,715
3,976,716
3,976,717
3,976,718
3,976,719
3,976,793
3,976,796
3,976,822
27 : 3,975,793
3,975,978
3,976,005
3,976,026
3,976,033
3,976,328
3,976,606
3,976,651
3,976,762
3,976,774
3,976,844
3,976,872
28 : 3,975,909
29 : 3,975,965
3,976,225
3,976,321
3,976,428
3,976,529
3,976,585
3,976,589
3,976,593
3,976,891
30 : 3,976,469
31 : 3,976,197
32 : 3,975,912
3,976,761
34 : Re.28,940
3,975,821
3,975,822
3,975,869
3,975,900
3,975,933
3,975,980
3,976,016
3,976,075
3,976,173
3,976,175
3,976,223
3,976,377
3,976,383
3,976,421
3,976,530
3,976,535
3,976,548
3,976,563
3,976,572
3,976,579
3,976,580
3,976,586
3,976,587
3,976,598
3,976,601
3,976,611

3,976,617
3,976,634
3,976,637
3,976,638
3,976,639
3,976,642
3,976,643
3,976,657
3,976,660
3,976,684
3,976,685
3,976,689
3,976,694
3,976,714
3,976,757
3,976,763
3,976,765
3,976,766
3,976,785
3,976,801
3,976,839
3,976,847
3,976,863
3,976,867
3,976,869
3,976,923
3,976,958
3,976,960
3,976,996
3,977,005
35 : 3,976,276
3,976,310
3,976,898
3,976,973
36 : 3,975,775
3,975,804
3,975,811
3,975,823
3,975,839
3,975,850
3,975,885
3,975,891
3,975,904
3,975,959
3,975,960
3,976,011
3,976,035
3,976,040
3,976,050
3,976,057
3,976,081
3,976,086
3,976,114
3,976,162
3,976,165
3,976,181
3,976,182
3,976,184
3,976,199
3,976,206
3,976,217
3,976,272
3,976,285
3,976,288
3,976,301
3,976,332
3,976,370
3,976,430
3,976,441
3,976,448
3,976,451
3,976,482
3,976,483
3,976,485
3,976,496
3,976,504
3,976,505
3,976,511
3,976,524
3,976,549
3,976,554
3,976,568
3,976,620
3,976,653
3,976,661
3,976,682

3,976,700
3,976,722
3,976,725
3,976,732
3,976,736
3,976,751
3,976,758
3,976,767
3,976,811
3,976,812
3,976,833
3,976,836
3,976,865
3,976,880
3,976,881
3,976,911
3,976,941
3,976,950
3,976,989
3,976,991
3,976,992
3,977,006
37 : 3,975,860
3,975,929
3,975,936
3,975,956
3,976,085
3,976,102
3,976,244
3,976,319
3,976,349
3,976,457
3,976,527
3,976,578
3,976,826
3,976,910
3,976,939
38 : 3,975,990
39 : 3,975,776
3,975,781
3,975,792
3,975,863
3,975,888
3,975,969
3,976,000
3,976,015
3,976,019
3,976,055
3,976,090
3,976,098
3,976,211
3,976,215
3,976,218
3,976,221
3,976,224
3,976,252
3,976,253
3,976,264
3,976,277
3,976,341
3,976,343
3,976,387
3,976,394
3,976,401
3,976,409
3,976,436
3,976,439
3,976,440
3,976,456
3,976,463
3,976,610
3,976,625
3,976,627
3,976,628
3,976,635
3,976,663
3,976,705
3,976,729
3,976,770
3,976,794
3,976,799
3,976,823
3,976,885
3,976,912
3,976,924

3,976,942
40 : 3,976,021
3,976,136
3,976,139
3,976,445
3,976,570
3,976,630
3,976,632
3,976,821
3,976,919
41 : 3,975,957
3,975,976
3,976,093
3,976,112
3,976,236
42 : Re.28,939
Re.28,941
3,975,777
3,975,801
3,975,802
3,975,809
3,975,874
3,975,875
3,975,880
3,975,902
3,976,065
3,976,077
3,976,109
3,976,122
3,976,155
3,976,240
3,976,275
3,976,279
3,976,313
3,976,345
3,976,437
3,976,438
3,976,460
3,976,462
3,976,517
3,976,531
3,976,547
3,976,557
3,976,592
3,976,633
3,976,641
3,976,648
3,976,681
3,976,686
3,976,691
3,976,692
3,976,693
3,976,695
3,976,696
3,976,698
3,976,723
3,976,782
3,976,807
3,976,852
3,976,875
3,976,902
3,976,909
3,976,956
3,976,965
44 : 3,975,921
3,976,029
3,976,059
3,976,465
45 : 3,976,464
3,976,597
46 : 3,975,857
3,976,315
47 : 3,975,930
3,975,955
3,976,295
3,976,495
3,976,575
3,976,735
3,976,741
3,976,775
48 : 3,975,836
3,975,856
3,975,919
3,976,051
3,976,058

3,976,094
3,976,133
3,976,134
3,976,137
3,976,138
3,976,140
3,976,148
3,976,161
3,976,179
3,976,207
3,976,212
3,976,213
3,976,245
3,976,250
3,976,300
3,976,312
3,976,329
3,976,347
3,976,351
3,976,403
3,976,407
3,976,551
3,976,569
3,976,595
3,976,697
3,976,724
3,976,744
3,976,838
3,976,931
3,976,937
3,976,943
3,976,975
3,977,018
49 : 3,976,062
3,976,311
3,976,537
3,976,576
50 : 3,976,047
3,976,330
51 : Re.28,937
3,975,816
3,975,827
3,976,004
3,976,043
3,976,243
3,976,281
3,976,431
3,976,479
3,976,521
3,976,652
3,976,759
3,976,792
3,976,810
3,976,861
3,976,868
3,976,944
3,976,999
53 : 3,975,778
3,975,797
3,975,949
3,976,066
3,976,099
3,976,100
3,976,129
3,976,267
3,976,269
3,976,293
3,976,848
3,976,849
54 : 3,976,147
3,976,747
55 : 3,975,794
3,975,986
3,976,002
3,976,014
3,976,074
3,976,177
3,976,273
3,976,424
3,976,459
3,976,731
3,976,734
3,976,842
3,976,987
56 : 3,976,453

1 : 241,116	241,165	18 : 241,103	27 : 241,130	241,111	241,171
3 : 241,160	241,166	241,136	29 : 241,127	241,117	41 : 241,083
4 : 241,159	241,169	241,137	34 : 241,084	241,118	42 : 241,101
6 : 241,097	241,172	241,138	241,085	241,119	241,128
241,110	241,181	19 : 241,152	241,095	241,162	44 : 241,149
241,113	8 : 241,086	25 : 241,134	241,104	241,167	47 : 241,176
241,114	241,125	241,135	241,151	241,168	48 : 241,108
241,115	241,141	241,145	241,175	241,170	241,126
241,139	9 : 241,089	241,177	36 : 241,092	37 : 241,090	51 : 241,112
241,140	241,157	26 : 241,096	241,093	241,129	55 : 241,105
241,143	241,179	241,123	241,094	241,155	241,106
241,144	12 : 241,147	241,124	241,102	39 : 241,121	241,154
241,148	13 : 241,099	241,163	241,107	241,158	241,182
241,153	17 : 241,109				

PLANT PATENTS

39 : 3,941	3,943	3,945	3,946	3,947	48 : 3,948
39 : 3,942	3,944				

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U.S. DEPARTMENT OF COMMERCE
Elliot L. Richardson, Secretary

PATENT AND TRADEMARK OFFICE
C. Marshall Dann, *Commissioner*